DOCUMENT RESUME

ED 044 088 HE 001 817

AUTHOR Harris, Norman C.
TITLE Education and Middle Manpower Development in Malaysia.
INSTITUTION Michigan Univ., Ann Arbor.
PUB DATE [70]
NOTE 88p.

EDRS PRICE EDRS Price MF-$0.50 HC-$4.50
DESCRIPTORS *Developing Nations, Development, Economic Development, *Higher Education, *Junior Colleges, *Manpower Development, *Manpower Needs, Technical Education
IDENTIFIERS *Malaysia

ABSTRACT

One of the essential factors in the economic development of nations is the attainment of a manpower mix which is strategically suited to current development problems, and which will also provide a catalyst for improvement and change. A review of the literature indicates that, although education per se is important, individual countries must practice different strategies of manpower development at different stages in their economic development. The thesis of this report is that for Southeast Asian and developing nations in general, middle manpower development, and the kinds of institutions needed for such development (technical colleges, junior colleges, post-secondary vocational schools, business colleges, nursing schools, etc.) should be given top priority in the decade ahead. In this report the importance of middle manpower is discussed in general and in Southeast Asia in particular. A brief overview is given of econcmic development in Malaysia, followed by a look at Malaysia's economy. Malaysia's present manpower mix is discussed in detail, as well as the country's educational system and its commitment to manpower development. The report concludes with a proposal for the establishment of a system of comprehensive junior colleges designed to meet Malaysia's manpower needs. (AF)

ED0 44088

EDUCATION AND MIDDLE MANPOWER DEVELOPMENT

IN MALAYSIA

U.S. DEPARTMENT OF HEALTH, EDUCATION
& WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

HE001 817

Norman C. Harris
Senior Specialist
East-West Center
Honolulu, Hawaii

Professor of Higher Education
Center for the Study of Higher Education
The University of Michigan
Ann Arbor, Michigan

Education and Middle Manpower Development In Malaysia

I. INTRODUCTION

One of the essential factors in the economic development of nations is the attainment of a manpower mix which is strategically suited to current development problems, and which will also provide a catalyst for improvement and change. Short-range tactical considerations might dictate "crash programs" of manpower training based on models which have been successful in meeting temporary manpower needs in other countries; but deep-rooted cultural and political patterns, coupled with economic inertia, often militate against the attainment of desirable national goals with such short-range job-training programs. This paper will address itself to the problem of manpower development over the long term.

Harbison and Myers[1] have contributed a great deal to our understanding of the complexities of economic growth by their attempts at a "global analysis of human resource development." A salient feature of their analysis and of their proposed strategy is the categorization of seventy-five nations of the world into four levels of human resource development based on a composite index which takes into account (1) enrollment at secondary school level as a percentage of the age group 15-19, adjusted for duration of schooling; and (2) enrollment in higher education as a percentage of the age group 20-24. A multiplier of five was assigned to the higher education factor as an arbitrarily chosen indicator of the relatively greater

importance of high level manpower, and therefore of higher education, to economic development.* Using their composite index, Harbison and Myers then ranked seventy-five nations in four "levels" of human resource development. For each of the four levels (I, II, III, IV), they then developed "strategies of human resource development" which in their opinion would be most effective at a given stage of political and economic development.

In contrast to the Harbison and Myers studies, which put major emphasis on education as a spur to economic development, Hagen[2] emphasizes more traditional economic parameters such as natural resources, capital formation, entrepreneurship, foreign investment, tax and fiscal policies, and competition in foreign markets, while assigning to education a somewhat less important role in the overall scheme of development. Hagen argues at some length that expanded educational opportunity is just as likely to be the result of economic development as to be the cause of it.

There is a rather extensive literature now extant, most of it having appeared in the decade of the 1960's, which deals with the related problems of education, manpower, and economic development. Much of it is backed by careful research on the part of economists, sociologists, political scientists, scientists, and educators. The conclusions, of course, depend on the investigator's theoretical constructs, and on the country being studied, ranging from a predominant "human resource development" point of view at one end of the spectrum (Harbison and Myers); to a "land-capital-labor" traditional-economics point of view (Hagen) at the other. The

---

*Two other indicators, which assess the orientation of higher education, were also used: (1) the percentage of students in higher education enrolled in scientific and technical faculties, versus (2) the percentage enrolled in the faculties of humanities, fine arts,and law in the same year.

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

central tendency of the recent literature on development, is that, although traditional economic factors such as national resources, internal and external capital, and a large labor pool are certainly important factors in development, human resource development (i.e., education) is an essential factor in all countries, and in some countries it is the most important factor of all.

Typical of a group of books and studies which emphasize human resources development as being essential to economic growth are the following: T. W. Schultz in The Economic Value of Education, (1963)[3] summarizes his own studies and those of others, making a strong case for investment in education as an essential factor in economic growth. Edgar F. Denison in The Sources of Economic Growth and The Alternatives Before Us (1962)[4] develops the thesis that, if the term "education" encompasses both the discovery of new knowledge, and dissemination to the many of knowledge already possessed by the few, then education (in the United States at least) has been the most important single factor in the growth of productivity during the past thirty years. H. Correa, in The Economics of Human Resources (1963),[5] and Harbison and Myers in Education, Manpower, and Economic Growth (1964),[1] take a strong position supporting the necessity for manpower development through education. John Vaizey in Education In The Modern World (1967)[6] gives a thoughtful appraisal of the role of education in economic development, within the context of the total task which he set himself, that is to provide a "panoramic view" of current educational policies and practices around the world. Gary Becker's Human Capital (1964)[7] is almost a classic in the field of human resource development; and B. A. Weisbrod's External Benefits of Public Education: An

Economic Analysis (1964)[8] assesses the economic return to society of investments in education.

Some writers have been concerned primarily with the economic return to society; others with the return to the individual. There is general (but not universal) agreement that investment in education yields very favorable rates of return to both individual and society, in most countries of the world.

Some attempts at establishing priorities for investment as regards education vis-à-vis transportation (or some other badly needed infrastructure improvement) have been made recently by a number of well-qualified investigators. The term, "rate-of-return analysis," has been given to these investigations, since they attempt to determine, based on the premise that there are never enough resources to do all the things that might be good for an underdeveloped nation, which, among many possible investments, would provide the greatest rate of return to the economy. Is it better to build an airport or provide a new teachers' college? A harbor or a university? Or, within the educational sector itself, is it better (i.e., which will result in a greater rate of return on investment) to expand primary education in an all-out attempt to wipe out illiteracy, or to minimize educational investments at this level in order to provide a network of post-secondary technical schools? Most rate-of-return studies, or cost-benefit analyses, as they are also called, attempt to assess only the economic benefits from educational investment. Education as a "consumer good" or as a social leaven, is not a part of such studies.

Recent contributions to "rate-of-return analysis" include T. W. Schultz's, "The Rate of Return in Allocating Investment Resources to Education," in The Journal of Human Resources, II, 3 Summer, 1967;[9] and

Giora Hanoch's, "An Economic Analysis of Earnings and Schooling" in the same issue of the Journal. Also in the same journal, the entire Summer 1967 issue of which is devoted to a symposium on rates of return to investments in education, are papers by Mark Blaug, Nalla Gounden, and Martin Carnoy on analyses done in England, India, and Latin America respectively. A brief compendium, now somewhat outdated, on rate-of-return analysis, is contained in the booklet by Innes. Jacobson and Pellegrin entitled, The Economic Returns To Education--A Survey of the Findings[10] published by the Center for Advanced Study of Educational Administration, University of Oregon, in 1965.

Throughout most of the investigations referred to and in many others which space limitations preclude listing, there runs the rather clear theme that, although education per se is important, individual countries must practice different strategies of manpower development at different stages in their economic development. Indeed, some evidence exists to show that undue emphasis placed on the "wrong" level or kind of education at a given stage of development may have a negative rather than a positive effect on economic growth. Two examples serve to illustrate the point: (1) those nations which for prestige or for traditional reasons held over from colonial regimes, have strained their budgets to establish universities which emphasize the arts, law, mathematics, theoretical sciences, and advanced graduate study when the nation now, or in the foreseeable future has little economic need for emphasis in these fields; and (2) certain nations which, for political or egalitarian reasons have allocated almost all of their available resources for education to primary school development with the announced goal of "free education for all" and the elimination of illiteracy in a few years. It is of course unpopular to criticize either of

these courses of action (they are, in the currently popular phrase, "motherhood issues") but governments faced with the rock-hard responsibility for their nation's economic future may have to take the unpopular position from time to time. Either or both of the above decisions (i.e., to create a major university, or to expand primary schoos) might be defended on intellectual, political or humanitarian grounds with only the short-term in view; but for a given nation at a given time, either or both might be inadvisable--even catastrophic--on economic grounds, with long-term national goals in view.

Southeast Asia as a world region, is no exception to the thesis that education for manpower development is important and that viable strategies for each nation must be arrived at by careful planning. Choosing among "goods" is the most difficult of all choices, but developing nations must choose, since their resources are not sufficient to accomplish all "goods" within the scope of a five- or ten-year plan.

Some questions germane to strategic planning for education and economic development are posed here:

1. What are the basic, elemental resources for economic development? Agriculture, minerals and timber, fisheries, manufacturing, trade? What is their current and long-term potential for economic growth?
2. Related to (1): What are the sources, current and potential, of net income to the nation from exports--either of raw materials or of finished or semi-finished products embodying the "added value" from trained manpower? Can these sources be expanded and exploited? How much can "added value" in finished or semi-finished products increase net income from foreign trade? In other words,

within the limitations imposed by the maximum possible supply of basic resources, will a determined manpower development program produce enough added value, over and above the value of the basic unprocessed raw materials, to justify the cost of the planned human resources development? What might be the rate of return on the investment to society? Will the rate of return to the individual be sufficietnly attractive to assure satisfactory enrollments in "new" educational programs?

3. What are the needs of the nation itself--in government, health, transportation, housing, welfare, communications, etc. which mandate greater human resources development?

4. What are the current and estimated future needs of the private sector? To what extent is economic inertia caused by a lack of well-trained manpower?

5. What are the cultural, religious, political, tribal, or other societal factors which must be taken into account in planning educational development? Are there certain beliefs, mores, traditions, and life styles which are likely to be destroyed if education through and beyond secondary school becomes the expectation of many? If so, what new ones will take their place? Is there a danger of creating a class of "educated unemployed" with alienation growing, pari passu with educational opportunity? If education is indeed the search for truth, and if "truth sets one free," what happens to a nation when the new (educated) generation is set free from the culture of past customs, beliefs, and traditions?

At one time the clear purpose of schools was to transmit the culture and to insure the preservation of the society. Such is hardly the case in many Western nations today, and centuries-old questions about the purposes of education still go unanswered. Each Southeast Asian nation will have to face these issues squarely and decide the relative emphases to be put on the following possible roles for education:

5-1. Education as a change agent, re-casting society.

5-2. Education as a transmitter of the culture--as a bulwark for the preservation of the existing society.

5-3. Education as a vehicle for economic development.

6. Are there cultural, religious, ethical, environmental, societal linguistic, or entreprenurial factors in operation which, though a given course of action seems rational, will doom the plan to failure regardless of good administration and proper financing?

7. If a financial commitment of considerable magnitude is to be made to education, where (i.e., at what levels) shall the priorities be assigned? Universal primary education? Emphasis on secondary education? On vocational education for adolescents? First priority to the development of a university of unquestioned quality?

In ending this introductory section the following hypothesis is introduced: It is at least possible that none of the four levels or kinds of education just cited should receive top priority, but that from economic considerations, a different kind and level of human resource development should take precedence, in the interest of more rapid economic growth. The thesis of this paper is that, for Southeast Asian and developing

nations in general, middle manpower development, and the kinds of educational institutions needed for such development (technical colleges, junior colleges, post-secondary vocational schools, business colleges, nursing schools, etc.) should be given top priority for investment in the decade ahead. The following sections of the paper develop the rationale for such a position.

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

II. THE IMPORTANCE OF "MIDDLE MANPOWER"

The phrase "middle manpower" first came into popular use following a conference on manpower utilization held in Puerto Rico in 1962 under the Alliance for Progress program then in effect between the United States and Latin American nations. The term was used at that time in a relatively restricted sense to describe technicians and other semi-professional workers whose jobs were principally in industries where engineers, scientists, and other professionals needed the skills and talents of technical assistants. In recent years however, the concept of "middle manpower" has become much broader and deeper. At present there is an increasing use of the term to describe occupations across a broad front of economic endeavor, including agriculture and natural resources, business, health, and human services, in addition to the industry/engineering/science field which was originally the occupational domain of the technician. Vertically, in terms of job hierarchy, the term "middle manpower" now encompasses not only the semi-professional, sub-professional, and technician levels of jobs, but has deepened to include many of the highly skilled occupations as well. The two-dimensional diagram of Chart 1 (next page) will assist in clarifying the use of the term "middle manpower" as it is now being used in the United States. The breadth of the concept is indicated by the five fields of economic activity across the horizontal dimension, and the depth of the concept is indicated by the three occupational "clusters" listed along the vertical dimension. A few examples of middle manpower job titles are listed in each box of the matrix for purposes of illustration.

Chart 1
Examples of "Middle Manpower" Jobs in Five Fields of Economic Activity
United States, 1970

Fields of Economic Activity				
Agriculture and Nat. Resources	Business	Health	Industry/Engr./Science	Human Services
Agric. Research Tech. Farm Equpt. Designer Fisheries Research Technician Forestry Aide Landscape Designer Plant Propagation Technician Soils Technician Veterinarian Aide	Accountant (not C.P.A.) Advertising Designer Branch Mgr. (Bank, Store, Office) Buyer-Purch. Agent Credit/Collections Mgr. Insurance/Real Estate Salesman Personnel Analyst Sales Manager Salesman (Outside) Secretary Systems Ana'yst	Dental Hygienist Dental Lab. Tech. Medical Lab. Tech. Medical Records Tech. Nurse (Registered, but non-BS degree) Operating Room Tech. Physical Therapy Tech. Psychiatric Technician X-Ray (Radiologic) Technician	Aerospace Technician Architectural Design Technician Civil Engr. Technician Computer Programmer (Science) Electronics Engr. Tech. Mech. Engr. Technician Sales "Engineer" (non-degree) Science Research Tech. (Physics, Chemistry, Biology, Oceanography, Astron., Meteorology) Tech. Writer (Illustrator)	Audio-Visual (Media) Technician Fire Dept. Officer Law Enforcement Officer Librarian Assistant Recreation Leader Sanitation Technician Social Worker Aide Teacher Aide Urban Planning Tech.
Agri-Business (Owner-Mgr.) Agri-Business (Salesman) Crop Duster (Aviator) Farm Mgr. (Owner) Horticulture Tech. Irrigation Specialist Nursery Operator Ranch Foreman	Bookkeeper Business Data Programmer Credit Interviewer Department Manager Owner-Mgr., Small Business Service Manager Stenographer	Certified Med. Lab. Assistant Dental Office Asst. EKG Technician Medical Office Asst. Mental Health Worker Occup. Therapy Tech. Physical Therapy Tech. Practical Nurse	Air Cond./Refrig. Tech. Automotive Technician Building Construction Mech. Design Technician (Drafting) Hydraulics Technician Instrumentation Tech. (Automation) Industrial Supervisor (Foreman) Operating "Engineer" Quality Control Tech. Tool and Die Technician	Chef Dining Room Hostess Fireman Hotel/Restr. Mgr. Nursery School Operator Owner-Mgr. (Service Establishment) Police Patrolman Tourist Guide Welfare Agency Clerk
Animal Husbandry Specialist Farm Equpt. Operator Farm Equpt. Repairman Feed Mill Operator Fisheries Worker Foods Processing Plant Operator	Bank Teller Cashier Data Processing Tech. Duplicating Services Technician General Office Worker Sales Clerk Typist-Clerk	Hospital Aide Inhalation Therapy Aide	Automotive Service Mechanic Building Trades Craftsman (e.g., Carpenter, Plumber, Electrician) Heavy Equpt. Operator Machinist (Journeyman) TV/Radio Service Mech.	Baker Barber Cook Cosmetician Service Station Attendant Waiter/Waitress

Defining middle manpower is not an easy task, since any classification of occupations is, to some extent arbitrary. It is difficult to define sharply the limits of semi-professional and technical jobs for the same reason that it is difficult to be certain of all the pursuits which can (or should) be called "professional." Job status is a sensitive issue and any scheme of classification will be roundly criticized by some. The matrix of Table 1 will be no exception, but it is an attempt to bring some order into the newly developing spectrum of middle-level occupations. All of the following criteria have been used, individually or severally, to characterize middle manpower jobs:

1. They are jobs "in the middle"--that is, along a manipulative-cognitive scale running from "all-manual" at one end to "all cognitive" at the other, they occupy a segment where a mix of cognitive and manipulative abilities is needed. (See Chart 2)

Chart 2

Middle Manpower Jobs Located On
A Manipulative-Cognitive Scale

		← Middle Manpower →		
Unskilled workers	Semi-skilled workers and operatives	Skilled trades and crafts jobs	Para-professional and semi-professional; technical, managerial, clerical, and very highly-skilled jobs	Professional and high-level managerial jobs

0 10 20 30 40 50 60 70 80 90 100

↑ ↑ ↑

Common Labor Jobs — no cognitive content; "all manual"

Per cent scale of cognitive-to-manipulative activity--approximate and arbitrary--for illustrative purposes only

Selected Professions — "all cognitive"; no manual skills

Note: It should be recognized that the lines of demarcation used for illustration in the diagram, do not really apply in practice. The spectrum of jobs from "all manual" to "all cognitive" is continuous, not discontinuous.

2. Generally, a period of one or more years of post-secondary education and training is required.
3. Middle manpower workers typically work with or for professional workers, or serve as liaison persons or connective links between professionals and manual workers.
4. Their work is more apt to be in design, research, planning, evaluation, testing, sales, or in human services and "people contact" activities, than in actual production of end products in a factory.
5. Although some middle manpower workers spend most or all of their time in "blue collar" pursuits, the majority of them do not. Middle manpower jobs are, for the most part in the "white collar," "sport collar" or "uniform-smock" categories.
6. Finally, the typical middle manpower worker in any of the broad areas of economic endeavor exhibits certain practical and manipulative talents not possessed by professionals in the same field; and by the opposite token, he has a grasp of theory and principles--cognitive processes--not possessed by manual workers in the same enterprise. He is, in a very real sense, the "man in the middle."

The position of middle manpower occupations within the total labor force, for the United States in a recent year, is shown (approximately) by Table 1 (next page). The percentages listed in both the 1960 and 1970 columns of Table 1 are admittedly imprecise. Neither the Bureau of the Census nor the U.S. Bureau of Labor Statistics, prepares data with exactly the same occupational category "breakdowns" as those used in Table 1. The percentages listed for both 1960 and 1975 are therefore estimates, although those for 1960 rest on a somewhat firmer foundation of known data than do

Table 1

Distribution of Labor Force by Occupational Groups
United States, 1960 and 1975 (est.)

Occupational Category or Group	Percent of total U.S. Labor Force	
	1960	1975 (est.)
Professional and high-level managerial	9	12
Para-professionals, semi-professionals, high-level technicians	3	6
Middle-level technicians, mid-management, foremen, leading men	5	9
Clerical, sales, and kindred, not including semi-skilled	10	14
Craftsmen, journeymen, very highly-skilled workers	14	13
Semi-skilled, and operatives in industry	20	16
Clerical and sales, semi-skilled	11	9
Service workers, all fields	13	13
Unskilled workers, including farm and mine	15	8

Middle manpower
1960=32%
1975=42%

those of 1975. In order to arrive at these estimates, research studies, manpower analyses, and employment figures from many sources have been compared and cross-checked. Sample sources include:

1. Detailed studies of technician employment made in several states of the United States.
2. National studies made within certain job fields, such as technician utilization and demand studies made by the National Science Foundation, Engineers' Joint Council, and the National Institutes of Health.

3. Periodic forecasts prepared by the Bureau of Labor Statistics, United States Department of Labor.
4. Studies made by national associations concerned with middle manpower, such as the National League of Nursing, the National Council of Technical Schools, the American Society for Engineering Education, etc.

Even though the percentages reported in Table 1 are approximate, as "ball park" estimates they lead to the generalization that in advanced industrial nations such as the United States, middle manpower, as defined in this paper, makes up nearly one-third of the labor force, and may in another decade or two, approach one-half of the total work force, if technological and scientific advances continue. It should be pointed out that we are here discussing the employed labor force, not the total manpower pool. It is a well-known statistic that, in addition to the approximate 8 to 10 percent of the labor force which finds employment in unskilled jobs, there is another 3 to 5 percent of the manpower pool which does not find employment. Their skills, attitudes, and level of knowledge are such as to make their employment in a technologically-based economy very difficult indeed.

Applicability to Southeast Asian Nations

Generalizing from the above analysis of middle manpower in the United States to predict with a measure of certainty the middle manpower needs of Southeast Asian nations is of course unjustified. Factors which militate against a rapidly growing demand for middle manpower in many Southeast Asian nations include:

1. The nature of agriculture. Small-holder and tenant (or peasant) farming is labor-intensive, and there are strong cultural and

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

societal factors at work which may make technological change very slow in coming.

2. Lack of capital-intensive, technologically-based industry in some countries, and lack of a market for the end products of such an industry.
3. Relatively undeveloped systems of health and medical care (although this situation is changing rapidly in some Southeast Asian countries).
4. Control of business enterprises (in some countries) by "outsiders," resident aliens, and foreign interests with home offices elsewhere.
5. Emphasis on economic endeavors associated with extractive industries and the export of raw materials, as contrasted with significant inputs of "added value" which would come from processing these raw materials at home.
6. Finally (and this point must not be pushed too hard), a reluctance, at least up to very recent times, to look at higher education as an economic good. The idea of turning higher education to <u>utilitarian</u> purposes has either not been sufficiently explored, or indeed, may have been summarily rejected. In some instances "elitest" ideas about higher education may be a holdover from a colonial regime. The underdeveloped country sees that the former colonial power is an advanced industrial nation and that its educational system is based on elitism; and so the elitest educational system in effect when the colonial power pulled out has been retained. Extreme pride in the high quality of a university, for example, may be a compensatory mechanism to "excuse" the lack of effective secondary and technical education systems.

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

Supply and Demand

More often than we realize, in the affairs of men and nations, supply creates its own demand. Examples are legion, but one or two will suffice:

1. A small supply of rubber became available in the early 1900's, and the rubber-tired automobile thus became possible. The growth of the auto industry soon engendered a massive world-wide demand for rubber.
2. In a developing country, a hydroelectric plant is built and there is a supply of electricity where there was not before. Industry becomes electrified, electric lighting evolves from a luxury to a necessity, homeowners install electrical appliances, factories electrify their machines, and the demand for electricity skyrockets.

In much the same way the availability of a small pool of well-trained manpower often "triggers" or catalyzes a spurt of economic development which in a very short time will demand large numbers of better-educated workers. And (best of both worlds) the "added value" to economic output more often than not pays for the private and public investment in education. Once again, caution cannot be thrown to the winds--this argument of supply creating its own demand can also be pushed too far--but thoughtful decisions supported by significant investments must be made in order to give higher education an opportunity to show its promise in catalyzing economic growth. The point being made here is that just because a job survey in a given month does not show large numbers of vacancies for technicians, secretaries, nurses, draftsmen, skilled mechanics, and the like, is not sufficient justification for concluding that the country does not need middle manpower. Strangely enough, employers (including those in the public sector) often need precisely

the kind of employees whose talents are not reflected in currently published job titles and descriptions.

Education and training for jobs which now exist is education for the status quo, not for economic development. The brief history of economic development in emerging nations has already amply demonstrated that the sought-after development does not come from rapid increases in either the quality of university education or for that matter in greatly increased numbers of university graduates; nor does recent history show that instant economic development follows from all-out literacy programs aimed at providing elementary schooling for all children. These "panaceas," popular though they may be for other reasons, do not constitute the key to economic growth.

One cannot say with any degree of certainty that middle manpower education is the key, either. But evidence from a number of countries seems to suggest that this level of manpower development "fits" better into the pattern of need of "emerging" nations than either of the other two emphases.

Several Southeast Asian nations, having completed one development plan, and ready to write another, are in a good position to assess the potential contribution which emphasis on middle manpower education might make. The sections to follow discuss some of these potentials in detail.

III. ECONOMIC DEVELOPMENT IN MALAYSIA--A BRIEF OVERVIEW

Malaysia as a nation was established in 1963 by combining four previously separate regions: the Federation of Malaya; the island state of Singapore; and the British Crown Colonies of Sarawak and Sabah, comprising the northern one-fourth of the island of Borneo. Singapore subsequently withdrew from Malaysia in August, 1965.

Malaysia is, in most respects, a "developing country" in the currently understood use of that term. The Gross National Product (GNP) in 1965 was M $8.73 billion (U.S. $2.85 billion) and the per capita income was M $928 (U.S. $303). G.N.P. is expected to grow at a 5 percent annual rate through the mid-1970's. This is a very healthy growth, and if it is realized, a net gain in standard of living will result, since population growth will be somewhat less than 3 percent per year.

The percentage of the labor force in agriculture is quite high (about 54 percent); and economic activity tends to be labor-intensive rather than capital-intensive. Industrialization, though some progress is steadily being made, is disappointingly slow, and unemployment remains at relatively high levels. The standard of living for the average citizen, though it is higher than that in most S.E. Asian nations, is still low by comparison with that in industrialized nations. Foreign exchange is a problem since the income from Malaysia's exports (principally rubber and tin), though considerable, is not rising at a rate comparable to the rising costs of imports.*

---

*For this and the following pages I have drawn heavily on Pierre R. Crosson: Economic Growth in Malaysia, Center for Development Planning, National Planning Association, Washington, D.C., 1966, hereinafter referred to as Ref. 12.

Population. Malaysia is a nation of over 9,000,000 people, some 4.5 million of them being Malays; nearly 3.5 million Chinese; over 1 million Indians and Pakistanis, and the rest indigenous native peoples such as Dyaks, Melanaus, and others. The land area is about 128,000 square miles. All of Malaysia is located in the tropics, in a region of ample rainfall. The soil is generally fertile, and there is nearly as much new land available for settlement and cultivation as the total area now under cultivation. At present, Malaysia is not over-populated, but the birth rate is high, averaging 3 percent over the past decade, and a condition of over-population could be reached within the next thirty years if the fertility rate is not decreased. The estimated population for 1975 is 12,600,000 reflecting an expected annual population increase of 2.9 percent.

Exports and imports. Malaysia is the world's largest producer of natural rubber, providing more than one-third of the world's supply. Rubber exports normally account for over one-third of the country's export earnings each year. Despite serious competition from synthetic rubber on the world market, rubber production is increasing in Malaysia and it will remain a principal bulwark to the economy for the foreseeable future.

Tin exports account for over 20 percent of export earnings annually, and new methods of tin mining are able to maintain a high rate of production in the face of gradually diminishing reserves of the ore. Timber and palm oil are the other two major exports. In spite of these very healthy extractive industries, Malaysia has an unfavorable balance of payments, the balance on goods, transfers, and services being -M $65,000,000 in 1969. (Ref. 20, Table 2-5). Heavy imports of capital goods are necessary since Malaysia has developed only a limited capacity for capital goods production.

Further, in the very process of building up industry, the necessity for importing capital goods increases.

Notwithstanding the favorable potential for agricultural production, the nation is not self-sufficient in foodstuffs and agricultural commodities. Projections through 1975 indicate that, for every agricultural commodity except tobacco, consumption is expected to grow faster than production--in other words, despite increased production, imports will also have to rise. Even in such basic food commodities as rice, vegetables, fruit and meat, Malaysia is not self-sufficient now, nor does it appear that she will reach self-sufficiency in all these commodities during the next decade unless Herculean efforts are made to expand agricultural production.

The labor force. The nation's labor force in 1965 was 3,213,000. It is estimated to be growing at a rate of 2 percent annually, giving estimated figures of 3,710,000 in 1970 and 4,200,000 by 1975. The proportion of the labor force employed in farming and agriculture-related pursuits was 54 percent in 1965, and it is expected to be about 51 percent in 1975.

Natural resources. Malaysia's natural resources of significant importance include the following:

1. Agricultural lands, which, although reasonably productive at present, can be made far more productive when concerted efforts are made to develop this sector of the economy. Improved management and cultivation of existing plantations, estates, and small-holdings could result in significant production increases; while the planned development of new lands, perhaps

equalling the acreage now under cultivation, could within a decade make Malaysia self-sufficient in most agricultural commodities.

2. Tin ore deposits, which, although the now known reserves are slowly being depleted, are and will be for some years to come a major source of revenue.
3. Timber--an asset which is only beginning to be exploited. Although the reserve wealth here is tremendous, careful planning should determine effective rates of exploitation, keeping in mind re-forestation, protection of water sheds, soil erosion, new land development, and similar long-range economic factors. Further, the value of these resources should be enhanced by developing lumber mills, a plywood industry, pulp mills, and similar secondary manufacturing plants which would give <u>added value</u> to the timber resources, while providing thousands of jobs for the growing labor force.
4. The coastline and the seas. A healthy fishing industry is already in existence, but it could be expanded greatly in the next decade, providing food for local consumption, jobs for citizens, and income from an expanded export trade. Heavy capital investment in refrigeration and food processing plants will be required to develop this industry.
5. Water for irrigation schemes and hydroelectric power. Engineering studies have indicated that the potential for water supply development for both urban and rural use is ample for decades to come. Hydroelectric capacity is already fairly well

developed, and present forecasts predict that by 1980 the hydroelectric potential of Malaya (not including Sarawak and Sabah) will be fully utilized. Load demand beyond 1980 will have to be met by new thermal power stations.

6. Manpower resources. The labor force is growing at a 2 percent annual rate, and the potential production resources embodied in the nearly 4,000,000 workers of the nation is a significant one indeed. Just how significant it will be over the next decade depends on the education and training which the labor force will receive. Human resource development is the biggest challenge facing the government of Malaysia today.

Political stability. Until recently, Malaysia was held up as a model for cross-cultural group cooperation in the building of a new nation. The "May 13th incident" of 1969, however, and its aftermath of tension and strain between races, has had a damaging impact on both political stability and economic development. The full dimensions of the impact of that confrontation may not be apparent for some years. Racial animosities are always nationally enervating, but when the two groups are of approximately equal size, the situation is all the more serious. Educational effort is slowed down, economic development is impeded, and capital investment dries up in a climate of political instability. As one surveys the total matrix of factors which, in the aggregate, determine economic development, the conclusion is that all are positive, encouraging, and progressive, except this one. When political stability is regained, development can again proceed at an encouraging rate.

Summary

Malaysia has all the potentials needed for a take-off in economic development. The currency is stable, the economy is supported by basic production rather than by will o'the wisps like tourism and real estate speculation, and a determined beginning has been made in infrastructure development and in educational reform. Some small beginnings in industrial development have been made and serious attention is being given to the development of new agricultural lands and to increasing production from lands now under cultivation. The only cloud on the horizon is the one resulting from political and racial tensions, and it is to be hoped that winds of harmony will spring up and sweep this cloud away in the near future.

With that hope, we turn to a brief analysis of the present economy in Section IV, as a prelude to an analysis of the "manpower mix" in a later section.

IV. A BRIEF LOOK AT MALAYSIA'S ECONOMY

Nearly all the countries of S.E. Asia (and Malaysia is no exception) are confronted with five problems, all of them serious, which militate against rapid and sustained economic growth. Each of these will be considered briefly, as they apply to Malaysia, in introducing this section of the paper.

1. The swift pace of population growth. The annual growth rate of the population of Malaysia over the period 1966-1975 will average about 3 percent. In absolute numbers an increase in population from 8,100,000 in 1960 to 12,600,000 in 1975 is envisioned (Ref. 12, Tables B.2 and B.5). The estimated increase will amount to a 55 percent growth in one and one-half decades. By 1985, if the same growth rate continues, the 1960 population will have doubled.

   Sensational population increases such as these come about from improvements in health and medical services which, in turn, lower infant mortality rates and increase the life span of adults. Better nutrition and improved general health care also increase fertility at all levels of society. Family planning measures are, at best, slow to be adopted and indeed they may be resisted by many people for a variety of reasons. Consequently, the population explosion continues unabated. Concurrent increases in agricultural output and in other economic sectors tend to mask for a time the seriousness of the population growth problem, but the day of reckoning is only fifteen or twenty years away.

2. The difficulties attendant on earning foreign exchange. Despite Malaysia's paramount position as the world's major supplier of

natural rubber, and as a major exporter of tin, the value of exports is growing only slowly at the exact point in time when societal pressures for consumer durable goods, and the need for heavy capital equipment to promote industrialization, are contributing to a tremendous increase in import requirements. Import requirements for the 1966-70 period have exceeded export receipts by a considerable margin (Ref. 13, pp. 57-58). If net private remittances (funds earned in Malaysia but remitted to country of origin by one-time immigrants to Malaysia) are added to the deficit expected on goods and services, the net difference between "outgo" and "income" from export receipts is of the order of M $2.5 billion for the 1966-70 period (Ref. 13, p. 58). Since the prognosis for improvement of the export situation is not too hopeful, a determined effort must be made to reduce imports, especially those which Malaysia could produce herself; to wit, foodstuffs and agricultural commodities.

3. The problem of unemployment. Like some other underdeveloped countries, Malaysia has a smaller percentage of the total population in the labor force than might be expected. The primary reason for this is the preponderance of youth in the population. Only about 50 percent of Malaysia's population is between the ages of 15 and 70. Or, put another way, over half the population is not of labor force age.

   The unemployment rate in 1967 was estimated to be 6.9 percent of the labor force (Ref. 14, Table I). For an advanced industrial nation, this figure would be considered untenably high, and it

certainly is much too high for satisfactory economic progress in Malaysia. There is no shortage of "labor" as such in Malaysia, as the unemployment figures show; although there are critical shortfalls with respect to high-talent manpower, which will be discussed later.

An analysis of data from 1962 provides an interesting pattern of unemployment rate by level of education, which (if a similar situation exists at present) should have a definite bearing on educational planning and development during the Second Malaysia Plan. Table 2 (next page) shows that, surprisingly, unemployment rates rose with increased levels of education, until the School Certificate level was reached. One possible conclusion from such findings is that primary and secondary education, singly or combined, although they may be of great importance for social, cultural, or political reasons do not guarantee job preparation, labor force participation, nor economic development. Consequently, proposals to expand primary and secondary education to a point where all youth could be accommodated, though perhaps justifiable on social or political grounds, are not justifiable on economic grounds. It would appear from Table 2 that (and assuming that such a study, if replicated in 1970, would show the same trends) investments made to increase the number of youth completing secondary school (if the curriculum were unchanged from 1962) would merely tend to exacerbate the unemployment situation.

However (see Table 3), the situation changes when post-secondary, technical, and college-level education is considered.

Table 2

Unemployment Rates by Level of Education

Malaya, 1962

Educational Level	Percent Unemployment	
	Males	Females
No education	3.1%	4.3%
Primary	5.3	12.8
Form 1 & 2	9.4	31.7
LCE or Form 3	10.9	29.3
Form 4	12.1	22.8
School Certificate	6.7	10.2
Higher School Certificate	9.5	21.9

Source: Ref. 12, Table 2.16, p. 40.

Table 3

Unemployment Rates Among Persons With

Higher Education and/or Technical Training

Malaya, 1962

Educational Level	Percent Unemployment	
	Males	Females
Technical Inst. or Trade School	0.2%	0.3%
Teacher Training College	0.00	0.00
Technical College (Polytechnic)	0.01	--
University	0.04	0.07

Source: Ref. 13, Table 2.17, p. 40.

Note from Table 3 that unemployment rates of persons with higher education or technical training, even in 1962, were so low as to be negligible. In terms of planning education for economic development, the inference is rather clear that, if resources are insufficient to expand education at all levels (and they usually are inadequate to this task) then a priority allocation should be made to post-secondary education, even if this means that further development of primary and secondary education might have to be postponed for a time.

Literacy and basic mathematical skills are essential to productivity from the labor force, and it is assumed that a primary school education achieves these objectives. But further education of two, three, or four years, does not seem to pay off in increased labor force productivity, because a new threshold is not reached at the level of educational development characterized by the School Certificate. From a strictly economic point of view, persons with seven to eleven years of formal education may be "overtrained" for the jobs which the traditional and predominantly labor-intensive economy offers, but "undertrained" for the jobs in the new and growing technological thrust of the economy.

It is strongly recommended that a number of cost-benefit-analysis (rate-of-return) studies be initiated to check on the current applicability of the inference just drawn. If secondary education in the arts and sciences stream is found to be largely a consumer good rather than an economic investment (the writer is not saying this is so, but is suggesting that the problem should be

studied), then future decisions on funding of educational programs can reflect this finding.

In any event, the problem of unemployment is a serious one, and it will require the continuous attention of the government. In 1968 youth unemployment was a serious problem. Various estimates placed the unemployment rate for youths aged 15 through 19 as hovering around 26 percent; and that for the age group 20 through 24 as 14 percent. Two factors are of extreme concern here: (1) The production lost to the nation because of the idleness of these young people; and (2) the unrest, crime, and politically explosive forces which such mass unemployment brings. Since half the population is 15 or under, the number of workers entering the labor force will for many years exceed those who retire. At least 100,000 new jobs must be created annually over the next decade just to keep the rate of unemployment from growing. And, in the long run, for the 1980's and beyond, population policies must be adopted which will stabilize the population growth rate at less than two percent per year.

4. The impending revolution in agricultural production. The so-called "green revolution" is well under way in S.E. Asia, and particularly in Malaysia. Rubber yields per acre have increased dramatically in recent years, and the development of new agricultural lands presages further growth in rubber production, as well as in the relatively newer culture of oil-palm and pineapple. With new strains of rice, double-cropping, and with the expected padi production from newly opened lands, rice production should trend sharply upward in the 1970's.

More important than new lands however, is new technology and a "different view" of agriculture. The new technology in agriculture, now known to a few, must become known to the many, through a greatly-expanded system of farm advisement. Infrastructure development--farm-to-market roads, electrification, mechanization, irrigation, processing plants, marketing and purchasing cooperatives, storage facilities (including refrigerated storage), and farm credit sources--should get a great deal of attention from government planners during the next plan period. Land reform, credit reform, market reform and competent farm advisement--all these steps are needed to give the Malaysian farmer the incentive to produce beyond what he perceives as his subsistence level.

All the theoretical knowledge needed for a revolution in Malaysia's agriculture is already known--but the application of theory is the problem. Whether or not Malaysia becomes self-sufficient in all or most all agricultural commodities in the decade ahead depends on how successfully the government addresses itself to the problems of communication, planning, advisement and infrastructure development. The technology (seeds, fertilizers, pesticides, machines, market analyses, etc.) is ready and waiting; but people must put it to use. And people work best when incentives are capable of realization. Entrepreneurship--an unusual talent in S.E. Asia in the business sector of the economy--needs to be developed also as an attribute of farmers. When farmers can be shown how their operations can make them money, over and above their subsistence needs, the problem of increasing production will take care of itself.

5. The relatively low level of human resource development. Harbison and Myers (Ref. 1, p. 42) rank Malaysia as a "Level II" (partially developed) country in terms of their world-wide study of human resource development. At that time (1964) Malaysia was near the middle of a distribution of 21 "partially developed" countries with respect to the factor of human resource development. Since then much progress has been made in the expansion of education and manpower training in Malaysia, and it is almost a certainty that if a similar study were done with 1970 data, Malaysia might well have moved into Level III status as a "semiadvanced" nation with respect to human resource development. However, much more needs to be done if Malaysia's manpower is to make a significant contribution to the economic goals of the nation between now and 1980. An extended discussion of this very important problem will come in a later section of the paper.

The Malaysian Economy--Strengths and Weaknesses

As has been pointed out on a previous page, the bulwarks of the Malaysian economy are rubber and tin. The future for rubber appears to be a hopeful one, since increased production can probably offset the drop in price of natural rubber on the world market. In the long run there is also the realization that synthetic rubber prices will probably trend upward, making natural rubber more competitive. Tin, on the other hand, has no such assured future. The known reserves are dwindling and exploration for new deposits has not been very productive. Re-working of once-mined areas by modern and more efficient techniques is holding tin production up, but obviously this cannot go on forever.

Agriculture. In the agricultural realm, oil-palm and pineapple are two crops which are now being promoted as being very promising for the future, in terms of export value. For in-country consumption, concerted efforts will be made during the 1970 decade, to become self-sufficient in such foodstuffs and commodities as rice, vegetables and fruits, meat, eggs, dairy products and edible oils. This self-sufficiency, if attained, will come from the increased production of new agricultural lands being developed under the FLDA and other government schemes; and from better and diversified production from farms already in operation. As was pointed out on a prior page, a great deal of the increased production needed will come automatically, if and when the farmer sees that he can personally profit from better management and new techniques. As long as the profit incentive is absent there is no great spur to production beyond the level needed for family subsistence. The major factor in promoting entrepreneurship among smallholder farmers is to overhaul the marketing and farm credit structure.

Omitting rubber for the moment, since it is already a central thrust of the economy, and looking at all other phases of agriculture including forestry and fishing), there is no reason why, with proper infrastructure development, improved marketing methods (perhaps using agricultural co-ops), extended banking and credit facilities, and a much improved agricultural extension (farm advisement) service, Malaysia should not become self-sufficient in nearly all basic agricultural commodities by 1980. In fact, with good management, a number of agricultural products (in addition to rubber, oil-palm, and pineapple) should be contributing to export earnings by the end of the decade.

An encouraging example of much-needed infrastructure development is the Muda River Scheme (Ref. 15, "Computer For the Ricefields," pp. 44-48)

which will bring water to 260,000 acres of the State of Kedah. Some 60,000 families who now eke out a mere subsistence on one rice harvest per year (lack of water prevents additional cropping), will, when the Muda scheme is completed in 1972, be able to double-crop rice, or alternate rice with other equally marketable crops such as corn, vegetables, and animal feeds. The scheme includes two dams and lakes; canals, ditches, and weirs for delivery of the irrigation water; and a system of drains to take water away when the crops are mature. Hopefully, the scheme will also include the necessary planning and operational framework to accomplish all of the following:

1) Farm advisement to show the farmer how he can most effectively double-crop his land, and to train him in effective management and accounting techniques.
2) Provision of new seeds, fertilizers, and pesticides which will maximize yield.
3) Provide the farmer access to low-cost credit, and the savings which will result from cooperative purchasing.
4) Provision of marketing cooperatives or other schemes which will allow the farmer to maximize his personal return, rather than being at the mercy of the buyer or "middle-man."
5) Enable the farmer, perhaps through a cooperative, to use mechanized equipment which may be essential to the stepped-up time sequence required by double-cropping.
6) Advisement too, in the non-technical realm, which will help the farmer make the necessary cultural adjustments implicit in the "green revolution."

Malaysian government officials are to be congratulated for their strong support of agriculture as the mainstay of economic development (Ref. 13, pp. 104-122). All too many underdeveloped countries have seen a vision of immediate industrialization, or tourism, or foreign investment (singly or in combination) as the magic wand for feats of economic legerdemain; and, also all too often, these "easy paths to instant success" have proved unsuccessful. If the last three decades of experience in planned economic development have taught us anything at all, it is that, for most countries, the first essential to economic viability is viability in agriculture--the ability of a nation to feed her people, and if possible have agricultural commodities left over for export.

Industrialization. Malaysia is, and intends to continue to be, a free-enterprise economy. However, just as government engages in infrastructure development for agriculture in projects like the Muda River Scheme, and in encouraging equitable systems of marketing, credit, and technical assistance for agriculture, so can government encourage industrialization by one or more of the following measures:

1. Maintenance of a stable currency and of political stability so that foreign investment will be attracted.
2. Providing certain inducements (sites, investment tax credits, marketing assistance, transportation and communications facilities, utilities, electric power, etc.) to attract industry. The well-conceived industrial parks such as those at Petaling Jaya and Batu Tiga are examples of the government's forward-looking policies in this regard. These policies should be continued.
3. Expansion of trade, technical, business and industrial education, and college-level occupational education, so that industry can

obtain well-qualified employees at skilled, technical, sub-professional, and professional levels. There is a nation-wide recognition of this problem, as the following quotation indicates:

> "....a shortage of skilled workers has long loomed over industrial development. Even, if the other elements could be brought together, there would not be much point in setting up factories, if the unskilled labour so abundantly available could not run them. The answer lies, of course, in technical education." (Emphasis added). (Ref. 15, "New Factories For the Peninsula," p. 53.)

4. Encouragement, even beyond the norm, for industries which are relatively labor-intensive and which will agree to locate their plants in the smaller towns and villages. Thus two problems can be dealt with simultaneously--(1) unemployment, and (2) slowing down the rate of urbanization.

Manufacturing has been growing at a quite satisfactory rate for over a decade, and best of all, a large part of the manufacturing output goes into export and earns foreign exchange. In 1968, M $419 million was the value of manufactured exports. Table 4 shows gross domestic product by industry for 1960 and 1965 together with annual growth rates.

Table 4 shows an annual growth rate (1965-67) for manufacturing of 10.7 percent, a rate of which any nation could be proud. The relatively high growth rates for electricity, water, and sanitary services; and for banking, insurance, and real estate are encouraging. The relatively slow rate of growth of the transport, storage, and communications sector is

Table 4

West Malaysia: Gross Domestic Product

By Sector of Origin, 1961-67

($ millions, constant 1964 prices)

	1961	1965	Average annual rate of growth 1961-65	1966	1967	Average annual rate of growth 1965-67
Agriculture, Forestry and Fishing..	1,706	1,943	3.3	2,066	2,155	5.3
Rubber Planting.....	909	1,012	2.7	1,070	1,109	4.7
Other Agriculture.....	528	530	0.1	557	561	2.9
Livestock.....	87	172	18.6	176	180	2.3
Forestry.....	73	93	6.2	106	117	12.2
Fishing.....	109	136	5.7	157	188	17.6
Mining and Quarrying.....	477	532	2.8	547	562	2.8
Manufacturing.....	444	702	12.1	790	860	10.7
Construction.....	206	318	11.5	330	340	3.4
Electricity, Water and Sanitary Services.....	82	129	12.0	144	160	11.4
Transport, Storage and Communications.....	201	247	5.3	255	268	4.2
Wholesale and Retail Trade.....	902	1,052	3.9	1,082	1,120	3.2
Banking, Insurance and Real Estate.....	69	108	11.9	118	129	9.3
Ownership of Dwellings.....	255	295	3.7	297	310	2.5
Public Administration and Defence.....	351	462	7.1	484	505	4.5
Services.....	685	912	7.4	962	1,010	5.2
Gross Domestic Product at factor cost	5,378	6,700	5.6	7,075	7,419	5.2

Source: Ref. 20, Mid-Term Review of the First Malaysia Plan, 1966-70, p. 14.

disappointing however. One is mindful of the fact that these are 1961-1967 data, and the picture might be much different if 1967-1970 data were available. Based on observations made during the writer's brief stay in Malaysia (November-December, 1969), it would appear that in recent years there has been a very significant investment in highways, communications and similar infrastructure developments.

Summary

Malaysia's economy has a great deal of basic strength. Agriculture is strong and getting stronger. Without decreasing the attention given to rubber production, the goals of the next plan period will undoubtedly include further development of oil-palm and pineapple production and fisheries production for export; and the development of rice, fruit, vegetables, meat, and dairy products production to the point of self-sufficiency in these commodities.

Industrially, new strength is evident each year, although effective government planning is offset by a lack of skilled manpower. Emphasis on further development must include a significant expansion of post-secondary collegiate-technical training to close this gap. Encouragement of industry development at local levels and in labor-intensive operations should be a coninuing government policy. The temptation to concentrate industrial development around major population centers, thereby attracting hundreds of thousands more people to the urban centers, should be avoided.

V. MALAYSIA'S PRESENT MANPOWER MIX

Even in advanced industrial societies, the data on manpower distribution among occupational categories do not allow for careful analyses of middle manpower occupations. Out-dated census-taking techniques, and the continued use of a three-level hierarchy in describing occupations (professional, skilled, unskilled), makes it exceedingly difficult to analyze trends and forecast future needs for middle manpower workers; and to make estimates of the need for education and training programs for this segment of the labor force.

In Malaysia the same problem exists. Available sources of data frequently subsume middle manpower workers under either the "professional-managerial" heading or under the "highly-skilled" heading, making analysis of semi-professional, sub-professional and technician level jobs and workers a very difficult task.

In the following pages however, utilizing such data as are currently available, the writer will attempt to bring into reasonable focus some of the problems of middle manpower development in Malaysia.

Table 5 shows the occupational distribution of employment in West Malaysia for 1962 and 1967.

Reference to the columns headed "Share," reveals the labor-intensive character of the economy. Nearly 68 percent of the work force in West Malaysia is engaged in either agriculture or production jobs, probably mostly at levels which would be classified as semi-skilled or unskilled. Not quite 7 percent of workers are in the combined categories of "Professional/Technical," and "Administrative/Managerial." By way of contrast, in nations

Table 5

Occupational Distribution of Employment

West Malaysia,* 1962 and 1967

(in thousands)

Occupation	1962		1967		% Change 1962-1967
	No.	Share	No.	Share	
Professional, Technical and Related	97	4.4	123	5.0	26.8
Administrative, Executive and Managerial	40	1.8	39	1.6	-2.5
Clerical	80	3.6	104	4.2	30.0
Sales and Related	257	11.6	235	9.6	-8.6
Agricultural	1,171	52.8	1,234	50.5	5.3
Miners, Quarrymen and Related	8	0.4	21	0.9	162.5
Transport and Communication	73	3.3	93	3.8	27.3
Craftsmen, Production Process Workers and Labourers n.e.c.	344	15.5	425	17.4	23.5
Service, Sport Entertainment and Recreation	150	6.8	170	6.9	13.3
Occupations not specified	--	--	2	0.1	--
TOTAL:	2,219	100.0	2,444	100.0	10.1

Source: Ref. 14, Table XIV.

*Comparable data for the Borneo States were not available to the writer.

where technology has had a major impact, the percentage in these categories would total 15 to 18 percent or more (see Table 1).

It is encouraging to note the 26.8 percent increase in "Professional, Technical, and Related" workers between 1962 and 1967, but one is concerned by the decrease in administrative, executive, and managerial workers by 2.5 percent in the same period. Increasing sophistication of the economy generally demands greater numbers of managerial personnel, not fewer. The decrease in numbers of "Sales and Related" workers is also a cause for concern, since it may indicate a "softening" of the private enterprise sector of the economy and of the volume of business and trade taking place in Malaysia. In a nation where government already employs such a large share of the educated labor force, a decrease in managerial, sales, and related workers is not a sign of healthy growth in the private sector. Table 6 shows the distribution of employment by major industry group, in West Malaysia for 1962 and 1967.

The First Malaysia Plan (Ref. 13, p. 80) emphasizes that the targets for 1970 are "noteworthy for their emphases on agriculture." The Prime Minister's Department, in the opinion of this writer, is to be commended for retaining a healthy emphasis on agriculture while also attempting to encourage development in other sectors. The government's land development plan (Ref. 13, p. 103) seeks to provide thousands of new jobs (and homes) for the new generation of farm youth as well as to attract some families presently living in urban areas back to rural living. If the new land development program proceeds on schedule and if population increases can be brought under control, Malaysia may be able to avoid the urban crises which are currently afflicting so many nations of the world.

Table 6

Employment By Major Industry Group

West Malaysia, 1962 and 1967

(in thousands)

Industry Group	1962		1967	
	Number	Percent of Total	Number	Percent of Total
Agriculture, Forestry, Fishing	471	21.3	521	21.3
Agricultural Products Processing	744	33.6	754	30.8
Mining and Quarrying	41	2.0	67	2.8
Manufacturing	151	6.8	209	8.5
Construction	44	2.0	84	3.5
Utilities	9	0.4	18	0.8
Commerce	300	13.5	260	10.6
Transport, Storage, Communications	75	3.2	94	3.8
Services	382	17.2	431	17.6
N.E.C.	2	--	5	0.3
TOTAL:	2,219	100.0	2,443	100.0

Source: Ref. 14, Table II.

It appears however, that the FLDA (land development) plans are not as successful as had been hoped. Reporting in 1969 on progress toward the goals of the First Malaysia Plan, Mehmet (Ref. 14, p. 7) points out that, as of 1968, the Plan's goals for full employment were far from being met. He attributes much of the blame to the "slow progress of the land development programme." The Mid-Term Review (Ref. 20) also acknowledges that many of the First Malaysia Plan's goals are not being met, particularly in land development, and in crops diversification. By implication, if not by direct reference, the shortfalls in agricultural production are blamed on shortages of farm-adviser manpower (Ref. 20, p. 50).

Mehmet points out clearly that new job development is not keeping pace with new entrants to the labor force and that, "even the fulfillment of the employment targets of the FMP (First Malaysia Plan) will imply sharply rising unemployment levels in West Malaysia through to 1972." (Ref. 14, p. 9). Mehmet makes a strong plea for a determined effort at land development and also for re-doubled efforts for industrial development. The unemployment "slack" might be partially taken up by labor-intensive, government-sponsored public works programs for infrastructure development, he points out.

By 1972, according to Mehmet's analysis, the work-force in West Malaysia will be of the order of 3.264 million. The total number of jobs for that year he forecasts as 2.82 million, if the new job creation rate is 377,000 per year until 1972, in accordance with FMP. According to these forecasts there could be 444,000 persons employed (13.6 percent of the labor force) by 1972--a grim picture indeed!

The Manpower Section of the Economic Planning Unit, Prime Minister's Department, has concerned itself with manpower forecasting through to 1980. The document, Manpower Requirements In Malaya, 1965-1980, presents useful

information, data, and commentary on the supply and demand of labor for the 15-year period (Ref. 16).

The Economic Planning Unit (EPU) has also published two other studies of Malaysia's manpower problems under the following titles:

Skill Manpower Requirements for Agricultural Development in West Malaysia, 1966-1985 (Ref. 17)

Manpower Requirements of Manufacturing Industries State of Malaya, 1965 (Ref. 18).

Another useful source of information, especially on scientific and technological manpower, is the report of the proceedings of the seminar held in Kuala Lumpur in March, 1969, by the Technical Association of Malaysia and Singapore (See Ref. 19).

The Mid-Term Review of the First Malaysia Plan (Ref. 20) is a valuable source of manpower information, since it contains an analysis of the progress made and the shortfalls experienced during the first three years 1965-1968 of the plan.

The following statements, based on conclusions gleaned from all of the reports and analyses cited above, plus information gained during the writer's visit to Malaysia in October and November, of 1969, attempts to summarize the general manpower situation in West Malaysia, as of early 1970. (Sabah and Sarawak are omitted because current data for these two States are not available to the writer.)

Some Comments on the Manpower Mix in West Malaysia, 1969-70

1. The labor force in 1967 was about 2,620,000 and the unemployment rate was 6.9 percent. The labor force in 1972 is likely to be about 3,260,000 and the unemployment rate could well be over 10 percent,

unless Herculean efforts at land development, industrial development, and private sector development are made in the interim period.

2. The labor force is characterized by a high participation in agriculture and agriculture-related sectors, and by relatively low participation in manufacturing and business sectors.

3. Less than seven percent of the employed labor force is composed of what is ordinarily regarded as high-talent manpower, but a shortage of such manpower is reported from many sources.

4. Although the potential for steady economic growth is present in Malaysia, there are certain factors which seem to inhibit it, to wit:

4.1. Steadily falling prices, on the world market, for natural rubber.

4.2. Reserves depletion of tin ore, with few new discoveries.

4.3. A rapidly increasing population.

4.4. Disappointingly slow progress in developing new lands.

4.5. Lack of diversification in agriculture and the necessity to import a large share of the national consumption of foodstuffs.

5. There is a severe shortage of high-talent and middle-level manpower, coupled with an over-supply of persons graduating from academically-oriented secondary schools who have few of the skills needed by the labor market. A recent study reports, for example, that throughout the spectrum of high- and middle-manpower (professionals, sub-professionals, technicians, teachers, etc.) from 17 to 40 percent of the posts are not filled with qualified Malaysians (Ref. 16, p. 6, Table 2).

6. There is a lack of development of the kind of industry which would allow Malaysia to profit from the added value which could be obtained by processing some or all of the nation's raw materials. This development will come largely from encouragement of private industry and perhaps through seeking foreign capital investment.

7. Reports from both the government sector and the private sector indicate that there is now, and will be for some years ahead, a shortage of highly-skilled, blue collar workers also. Such a shortage bodes ill for the success of an expanded manufacturing industry, even when capitalization, distribution, and marketing problems are solved.

Supply and Demand for Middle Manpower

By "middle manpower" is meant all those persons who work as semi-professionals, para-professionals, sub-professionals, teachers (those without a university degree), technologists, junior managers, and technicians; and also those who work in jobs requiring a high degree of skill training consistent with journeyman status, even though these latter may be "blue collar workers." (See Section II of the paper for a complete explanation of the term, "middle manpower".)

Several fairly recent studies have been made on current and projected future manpower requirements in Malaysia. Most of these omit the Borneo States from detailed analysis because of the paucity of accurate data on both present and future manpower requirements in those States. The paragraphs to follow draw quite heavily on the study entitled, Manpower Requirements in Malaya, 1965-1980 (Ref. 16), prepared in 1966 by the Economic Planning Unit of the Prime Minister's Department. The actual survey was conducted in March, 1965. Table 3 of Ref. 16 is entitled, "Employment

Requirements by Type and Level of Occupations, 1965-1980." A portion of that table is reproduced here as Table 7 of this paper.

Table 7

Employment Requirements by Level of Occupation

Malaysia (1965 and Projected 1970 & 1980)

Level of Occupation	All Sectors--Govt. & Private				
	Total Requirements			Percent Change	
	1965	1970	1980	1965-70	1970-80
Professional					
Managers	5,480	6,657	9,824	21.5%	47.6%
Technologists	3,794	5,587	9,762	47.2	74.7
Teachers	3,928	5,928	7,128	51.3	20.2
Other Professionals	1,991	3,130	5,205	57.3	66.3
Sub-Professional					
Junior Mgrs. & Accts.	8,158	9,715	13,883	19.1	42.9
Teachers	11,018	30,318	46,718	175.0	54.1
Technologists & Technicians	10,900	16,640	29,553	52.6	77.6
Highly-Skilled					
Blue Collar	87,653	107,043	148,096	12.1	38.4
Teachers	44,075	49,575	65,375	12.4	31.8
Other White Collar	54,718	67,225	101,006	22.9	50.2

Source: Ref. 16, p. 8.

The major concern here is with the "sub-professionals and "highly-skilled" categories of the above table, but the data for the "professional" group was included for comparison purposes. Analysis of such data is, regrettably, only as accurate as the data themselves, and, since 1970 information is not yet available there exists no real benchmark against which the survey projections for 1970 and 1980 can be checked. The Mahmet

study (Ref. 14), issued in 1969, makes use of 1967-68 data from the Socio-Economic Sample Survey of Households, but the compilations and groupings are those of UNESCO and ILO and are not compatible with the occupational categories used in the EPU study (Ref. 16).

In any event, assuming a reasonable degree of accuracy of the 1970 and 1980 predictions in Table 7 above, the growth in all of the sub-categories of middle manpower occupations between 1965 and 1980 is of the order of 75 percent, ranging from a low of 44 percent for "skilled" teachers (less than sub-professional) up to 225 percent for "sub-professional" teachers. The category, "Technologists and Technicians," will have to increase its numbers by 130 percent, and highly-skilled "Blue Collar" workers must be increased by 60 percent.

An analysis of absolute numbers is perhaps a better indication than percentage growth, of the manpower development challenge facing Malaysia. Between 1965 and 1980, 35,000 sub-professional teachers (plus retirements, quits, and deaths) will have to be trained; 19,000 technologists and technicians; 61,000 blue-collar skilled workers; and 5,000 junior managers and accountants. At the sub-professional level, just for new requirements alone, about 4,000 newly trained people per year, will be necessary for the 15 year period. And, allowing for a 5 percent attrition due to retirements, quits, and deaths, another 3,000 persons per year will be required--total 7,000 sub-professionals per year (on the average) between 1965 and 1980.

A similar analysis at the highly-skilled level shows that 8,700 new, trained, entrants per year will be required to account for growth, and nearly 11,000 per year to offset attrition--total 19,700 highly-skilled entrants to the labor force per year between 1965 and 1980.

Analysis of Manpower Needs by Sector

1. Agriculture

The EPU has issued a study entitled Skill Manpower Requirements for Agricultural Development in West Malaysia, 1966-1985 (Ref. 17). This report cites the fact that the ratio of trained manpower for agricultural development to total agricultural employment is only 2 per 1,000. One probable reason for the slow development of the FLDA new lands scheme is the continuing shortage of agricultural technicians and extension workers. In 1965 the number of persons in the agriculture extension service gave a ratio of only one active farm adviser* to 732 farm families. On this basis, with each farm adviser working in the field 160 hours per month, an average farm family could expect only 14 minutes' worth of assistance and advice per month!

Extremely serious shortages are also reported for professional level workers in agriculture (university and college teachers of agriculture, agriculture researchers, and agricultural supervisors), but our concern here is mainly with middle-manpower, technician-level, or sub-professional workers.

The EPU report (Ref. 17) lists projected requirements to 1985 for agriculture extension workers as shown in Table 8.

Table 8

Requirements for Agricultural Extension Personnel
(Cumulative) West Malaysia, 1970-1985

Category		1970	1975	1980	1985
Professional -	Specialists	325	385	456	490
	Supervisors	650	770	912	980
Sub-professional -	Operatives	2,600	3,062	3,648	3,900

Source: Ref. 17, p. 5.

*These are called "operatives" by the Department of Agriculture.

Critical as the need is for middle-level manpower in the extension service, this is only a part of the problem. Estates need agricultural technicians, managers, buyers, and foremen. The growing agri-business industry needs salesmen, advisers, servicemen, and managers--all with semi-professional/technical training in agriculture-related programs. Banks need persons trained in agricultural credit; new schemes like the Muda River Development need irrigation system specialists; and food processing manufacturers need buyers, estimators, and skilled mechanics.

When "non-extension" agricultural workers are added to "extension" workers, the needs through 1985 can be summarized as follows:

Table 9

Total Requirements for Skilled Agricultural Workers
(Cumulative) West Malaysia, 1970-1985

Category		1965	1970	1975	1980	1985	1965-85
Professional -	Specialists	238	975	1,150	1,368	1,465	1,227
	Supervisors	873	1,950	2,300	2,736	2,930	2,057
Sub-professional -	Operatives	1,204	7,800	9,186	10,944	11,700	10,446

Source: Ref. 17, p. 6.

To these total requirements must be added an annual attrition factor of from 3 to 5 percent for quits, deaths, and retirements, in order to arrive at needed annual production of newly trained persons for professional and sub-professional work in agriculture.

The supply situation for agricultural manpower. In the face of the critical need explored above the supply situation is grim indeed. The EPU

researchers present data, based on students currently enrolled, so that very little "guess-work" is involved, which show that, up to this year (1970) graduates of agriculture programs will amount to only about 11 percent of the demand for professionals and sub-professionals in agriculture. Table 10 gives a summary:

Table 10

Comparison of Estimates of Demand With Supply for Qualified Agricultural Workers, 1966-70

Category	Demand			Supply	Supply as a Percent of Demand
	Expansion Needs	Replacement Needs	Total Needs		
Specialists	737	33	770	340	39.1%
Supervisors	1,077	123	1,200	460	38.3
Operatives	6,596	174	6,770	203	3.0
Total	8,410	330	8,740	1,003	11.3%

Source: Ref. 17, p. 7.

Although the shortage is lamentable at all levels, the nearly complete failure to provide the advisers and technicians at the farmer-contact level (operatives) will, it is feared, result in stagnation of the entire agricultural development program. Agricultural scientists may make new discoveries and professional supervisors may make new plans, but unless these discoveries and plans are communicated to Malaysia's farm families, development will not be appreciably affected.

Narrowing the discussion to the category of "Operatives" (middle manpower), only 32 graduates were expected in 1969, and 110 in 1970 (Ref. 17, p. 8). Three new schools of agriculture have been agreed to for start-up

during the Second Malaysia Plan period, but their output will not begin until 1973, and even then the very best they can do will be to produce a total of 300 new operatives per year. Looking to 1975 and beyond, and accepting the values of need from Table 10, the nation should be planning schools and colleges now which would be producing 1,000 to 1,500 semi-professional graduates annually, as contrasted with the 400 annually which seems the maximum possible under current plans.

It is a gross understatement to predict that agricultural development in Malaysia will be "inhibited" or "slowed" by this shortage of farm advisers and agricultural technicians. The truth is that development may not take place at all without a four-fold increase in the farm advisory staff. Of what avail are new seeds, new fertilizers, new pesticides, new dams and canal systems, and even new lands if farmers do not have the benefit of advice in the field for the optimum use of new discoveries and techniques?

Not even mentioned yet is the future probability that, not only will thousands of advisers need agricultural education, but so will young farmers themselves!

2. Health and Medicine

Health and manpower planning in West Malaysia has received considerable attention in recent years. An authoritative document prepared by Dr. Abu Bakar bin Ibrahim, Assistant Director of Medical Services, contains a wealth of information on supply and demand factors for health manpower. Under the title, Certain Aspects of Health Manpower Planning in West Malaysia (Ref. 21), the publication contains projections of needed health manpower to 1980 and also a compilation of the numbers of persons in training in the various categories of health manpower at the several colleges and universities in

West Malaysia. Table 11, following, presents pertinent data for various health-related occupations at the middle-manpower level (sub-professionals, para-professionals, technicians).

Even a cursory analysis of Table 11 indicates that the rate of training new entrants for the paramedical field will have to be doubled or tripled, in many cases, over the 1966 and 1967 rates if the 1980 requirements are to be met.

Table 11

Estimated Demand and Supply for Semi-Professional, Technical and Paramedical Health Manpower, West Malaysia, 1966-1971-1980

Middle Manpower Occupational Category	Requirements 1966	1971	1980	Number Actually Trained in 1966	1967
Anti-Malarial Inspectors	214	332	450	-	-
Dental Nurses	228	441	1,440	48	37
Dental Technicians	76	189	692	10	-
Health Inspectors	340	498	900	5	26
Hospital Assts.	2,433	2,828	?	93	27
Med. Lab. Technicians and Assts.	189	361	2,380	38	51
Midwives	2,360	2,620	3,525	146	79
Nurses	2,309	3,509	5,417	353	223
Asst. Nurses	2,155	3,405	6,902	141	241
X-ray Technicians (Radiographers)	168	290	?	14	13

Source: Ref. 21, Appendix A and Appendix C.

As an example, the need for nearly 1,000 new dental nurses between 1971 and 1980 obviously cannot be met by producing 40 to 50 per year. Nearly

500 more dental technicians will be required in 1980 than are projected for 1971. At a production rate of 10 per year the gap will widen rather than narrow. A large increase in medical laboratory technicians (about 2,000) is needed between 1971 and 1980. At the 1966-67 rate of production (about 40 per year) this gap too will get wider and wider. With respect to nurses and midwives the supply-demand situation is somewhat better, but as regards health inspectors the 1966 and 1967 production was only a dribble where a torrent will soon be needed.

It would appear that, with regard to middle manpower for the health field, determined efforts will have to be made to build and staff new schools, colleges, and training centers, or the health improvement goals of the nation will not be met in the next decade.

3. Industry-Engineering-Technology

The manufacturing sector of the economy employed 101,000 persons in 1965 and it is expected (Ref. 18, p. 6) that more than twice this number will be employed in manufacturing in 1980. With regard to "middle-manpower" as defined in this paper, the following general estimates are presented in Table 12, as adapted from Table 1.2 of Ref. 18.

In general, it appears that in most of these categories of middle manpower in manufacturing, the expectation is that the number of jobs will double or perhaps triple in the 1965 to 1980 period. The "annual requirements" column includes the requirement for expansion as well as that for attrition due to quits, deaths, and retirements. Schools, colleges, and training centers must be producing by 1980 from two to three times as many qualified "middle-manpower" employees for the manufacturing sector as they will produce in 1970.

Table 12

Estimated Manpower Requirements of the Manufacturing Sector, for "Middle Manpower" Occupations, Malaysia, 1965-80

	Occupational Category	Projected Employment 1965 (actual)	1970	1980	Annual Requirements 1970	1980
Sub-professional	Business Specialists & Jr. Managers	1,300	1,624	3,255	167	335
	Engr. & Science Technicians	600	740	1,785	85	206
Skilled, White Collar	Bookkeepers & Jr. Accountants	3,434	4,484	9,684	500	1,079
	Secretaries, Stenos, Typists	707	896	1,994	100	223
Skilled, Blue Collar	Foremen	2,121	2,671	4,454	243	405
	Machinists, Millwrights, Fitters	3,090	3,900	6,488	354	590
	Electrical & Electronics Mechanics	868	1,065	1,823	97	166

Source: Ref. 18, Table 1.2, p. 6.

The study reported by Ref. 18 found that, in 1965, approximately 12 percent of jobs in the sub-professional category were either vacant or filled by expatriates.

The manufacturing sector is, of course, not the only employer of technicians, accountants, secretaries, and highly skilled tradesmen. The study reported in Ref. 16 attempted to arrive at the gross requirements for qualified workers needed during the period 1965-1970.

The results of this effort are shown in Table 13, again including the "Professional" category for comparison purposes. Note that a total of 8,689 new technicians and specialists is expected to be needed for the 1965-1970

Table 13

Gross Requirements for Qualified Workers
All Economic Sectors--Malaya, 1965-70

1	1965 Employment 2	Workers Needed, 1965-70: To Fill Vacancies[1] 3	To Replace Expats & Unqualified 4	To Fill New Jobs 5	To Replace Retirees[2] 6	Total 7	Workers Needed as % of 1965 employment 8	% Distribution of total workers needed 9	
All Listed Groups	221,154	-	-	-	-	113,525	51.4%	100.0%	
Professional									
Managers	5,144	118	1,097	1,177	722	3,164	61.5%	2.8%	
Technologists	3,304	346	808	1,793	496	3,443	104.2%	3.0%	
Teachers	2,975	835	671	2,000	446	3,952	132.8%	3.5%	11.2%
Other Professions	1,751	180	649	1,086	263	2,178	124.4%	1.9%	
Sub-Professional									
Junior Executives Accountants, etc.	7,684	230	478	1,557	1,153	3,418	44.5%	3.0%	
Teachers	9,544	1,144	842	19,300	1,432	22,718	238.0%	20.0%	
Technicians and Other Specialists	9,247	1,326	236	5,740	1,387	8,689	94.0%	7.7%	30.7%
Skilled									
Craftsmen	85,674	-	-	19,390	12,851	32,241	37.6%	28.4%	
Teachers	44,092	-	-	5,500	6,614	12,114	27.5%	10.7%	
Other White Collar (Secretarial, Clerical, etc.)	51,739	1,340	-	12,507	7,766	21,608	41.8%	19.0%	58.1%

1/ The number of workers needed to bring the vacancy rate down to 3%.

2/ Assumes that 15% of the 1965 employees will retire or otherwise leave the work force during the five-year period. This is entirely arbitrary because of the absence of useful studies of attrition rates of various types of workers. A working life of 40 years is assumed.

Source: Ref. 14, p. 10.

period. For accountants and junior executives the total is 3,418; secretaries and clerks 21,608; and skilled craftsmen 32,241. Column 8 gives workers needed for the five-year period as a percentage of the 1965 employment. Note that the number of new technicians to be supplied during the five-year period is nearly equal to the total number employed (94%) in 1965. Skilled craftsmen should have been increased by 37%; secretarial and clerical workers by 42%; and sub-professional teachers by 238%. Looking at the decade 1970-1980, and (lacking information for more precise projections) extrapolating needs at the same rates of growth as those used in Table 13, the need for middle manpower development is readily seen as critical. And, it should be clear that, as technology begins to have a major impact on the economy of a developing nation, the need for semi-professional technicians jumps exponentially rather than along a linear scale. Somewhat the same condition is true for skilled craftsmen, especially those in the machine and electrical trades.

Potential supply of persons for industrial, technical, and engineering/scientific development. Malaysia faces a situation similar to that encountered in many other developing countries today. The nation's school system has been greatly expanded and access to primary and secondary education has been improved so that the "upper secondary arts and sciences stream accounts for 21.8 percent of all school leavers in 1970."* But, as of 1970, only 5 percent of new jobs call for that qualification. In contrast, 2.1 percent of all new jobs are in the sub-professional-specialist group, and only 0.2 percent of the educational output will have the necessary qualifications. In 1970, the Kuala Lumpur Technical College and the Agricultural

---

*Ref. 16, p. 13, paragraph 6.

College at Serdang will turn out only about 1,500 qualified persons for sub-professional and technical jobs, in the face of a need estimated at more than 8,500 (Ref. 16, p. 13, para. 4).

The vocational and technical streams at the secondary level (a source of highly skilled workers) will have virtually no output until after 1970. During the 1970's perhaps 7 percent of the labor force will come from these streams, and, of course, many workers prepare for these jobs through on-the-job training rather than in formalized instructional programs. The estimated manpower requirements of new skilled craftsmen for the 1965-70 period was 32,241, but the total output of persons from the vocational and technical streams of the upper secondary schools for the same period was only 23,000 (Ref. 16, p. 14, Table 4).

In summary then, as regards the economic sector which includes manufacturing, heavy industry development, and engineering/science-related development, there are now and will continue to be for an indefinite period ahead, serious-to-critical shortfalls of semi-professional technicians and highly-skilled craftsmen.

4. Teachers

The EPU planners, writing in 1966, noted that, "...it remains clear that provision of enough teachers of suitable qualifications for the expansion of secondary education is the biggest manpower development problem confronting the nation." (Emphasis added) (Ref. 16, p. 12, para. 3). This writer would add that, although the need in absolute numbers is not as great, the shortage of teachers qualified to instruct at post-secondary levels (technical colleges, agricultural colleges, business colleges, and in schools and institutes for training health manpower) is and will be an even more critical problem.

The supply of teachers at the school certificate-plus-specialized-training level (for primary schools) is becoming adequate to meet demands; but the supply of both "professional teachers" (university preparation) and "sub-professional teachers" (School Certificate plus one year of college) is far below the demand. The 1965-70 requirement for teachers at this level was 22,700; but the total output of persons with the desired qualifications to teach at this level was only 8,000 (Ref. 16, p. 14, Table 4). A tremendous expansion in teacher education must occur in the 1970's and thousands of the graduates of teacher education programs in the decade must be prepared to teach in occupationally-related programs in agriculture, business, engineering technologies, health fields, and public service fields.

5. Other Semi-Professional and Technical Personnel

As Malaysia's economy develops and changes, and as technology begins to make a significant impact, there will be a need for thousands of other semi-professional and technical level personnel in job titles such as the following:

Accountants and systems analysts

Advertising layout specialists

Audio-visual technicians

Business data programming technicians

Credit analysts

Designers and urban planning assistants

Draftsmen

Finance and banking managers

Foremen and estimators

Forestry, fisheries, and natural resources technicians

Hotel, restaurant, and tourism managers

Library aides

Refrigeration and air conditioning technicians

Salesmen and purchasing agents

Science research technicians

Secretaries (legal, medical, technical, bi-lingual)

Small business entrepreneurs

Social worker aides

Teacher aides

At present Malaysia has very few programs or schools to train these types of personnel, although MARA Institute serves some of these needs. Secondary schools are not suitable; the university would not welcome the task; and technical institutes usually tend to specialize in engineering/science/industry related programs. New "plans" will probably have to be made to provide for the training needed by workers in these occupations, and the planning should begin as soon as possible.

Some comments on the educational system of Malaysia, and its suitability for achieving manpower and economic goals, follow in the next section.

VI. THE MALAYSIAN EDUCATIONAL SYSTEM AND ITS COMMITMENT TO MANPOWER DEVELOPMENT

Chart 3 (next page) shows the enrollment pyramid for public and private schools, colleges, and the university for the entire nation, from data available for the year 1967, extracted from Refs. 22 and 23. The relatively high participation in schools, of Malaysian children through primary education--well over 90 percent--is noted, and is most certainly commendable, since functional literacy of the population is an absolute essential to national development. The participation rate in lower secondary education, being in excess of fifty percent of the age group, is also regarded as being commendable at this stage of Malaysia's development.

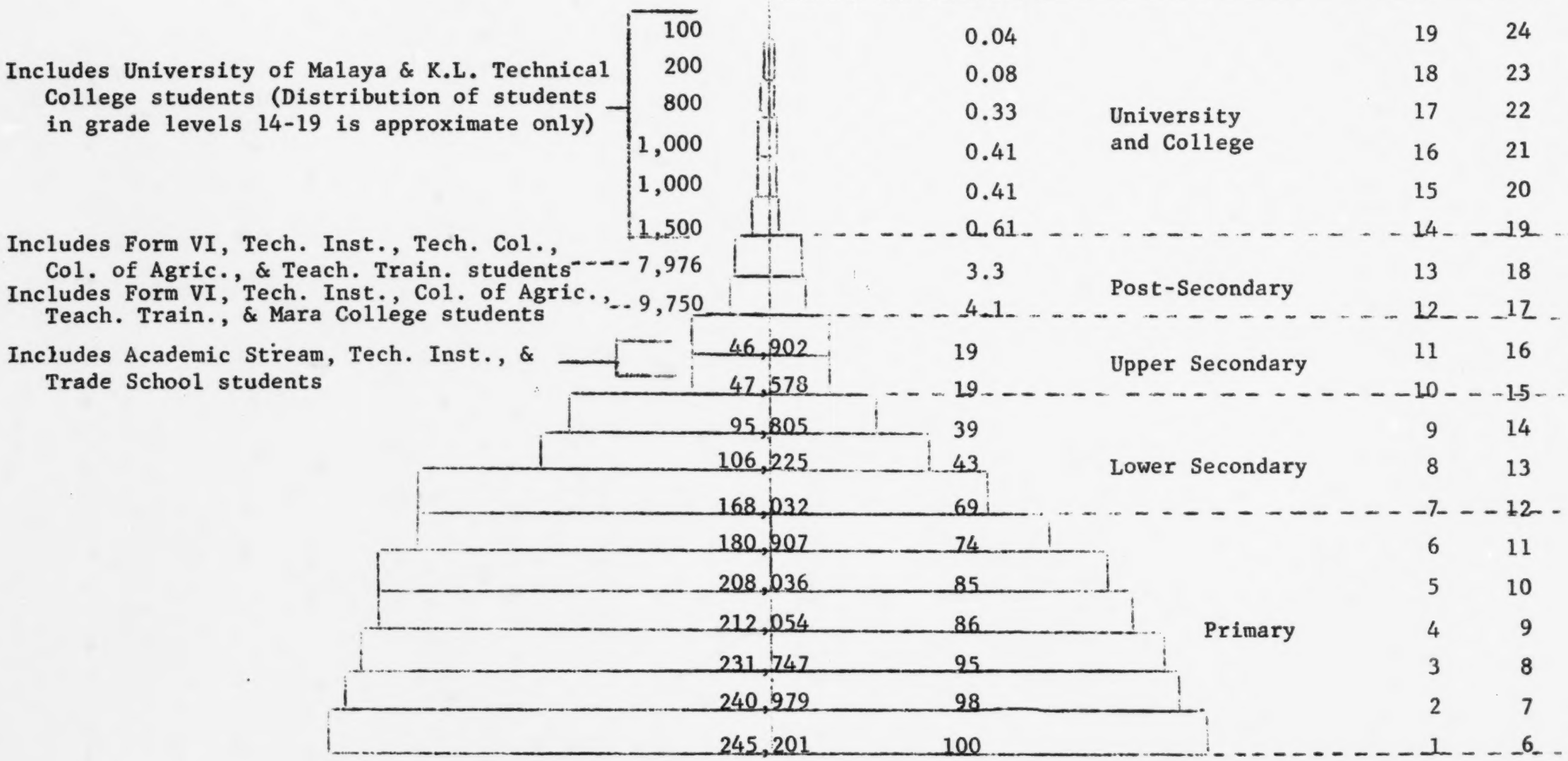
At the upper secondary level, however, the participation rate of the age group falls off rapidly. Although the participation rate (16 percent) is perhaps not too low for the current stage of national development, taking into account all the other "needs" of the nation, the division of students among programs is questionable, at least from the point of view of economic development. From Table 14 it is noted that, with respect to upper secondary education, almost the entire enrollment is in "assisted schools" where the program emphasis is on academic education.

Comprehensive schools. The lower-secondary schools are classed as comprehensive, and the upper-secondary schools as post-comprehensive. Pupils sit for the Lower Certificate of Education (LCE) examination at the completion of lower-secondary level (age 15). A "creditable" mark wins a place in post-comprehensive (i.e. upper-secondary) classes. Those who obtain a mere pass may go to a trade school (but, on the evidence, very few do), or directly to employment.

Malaysia Educational System

The Pyramid of Enrollments 1967

(Assisted and Private Schools)



Source: Educational Statistics of Malaysia, 1938-1967. Educational Planning and Research Division, Ministry of Education. Malaysia.

The upper-secondary school system (post-comprehensive) features the assisted schools (academic); and the technical institutes and secondary trade schools. Less than three percent of all upper-secondary pupils in 1967 were enrolled in vocational-technical education (Table 14).

In the assisted (academic) schools there are "streams" for arts, science, agriculture, technical, commerce, and home science. All students, however, take the same arts and sciences "core," which comprises about 80 percent of the curriculum. It is quite clear that the primary purpose of the assisted schools (Form IV and Form V) is preparation for further study. The disappointing factor however, is that, except for teacher training, there seems to be very limited opportunity for post-secondary education which is occupationally related. In 1967 only about 1,800 students were reported to be enrolled (Table 14) in occupational programs (other than teacher training) at the post-secondary level, in all publicly supported schools in the country. In 1966 Technical College, Kuala Lumpur, had only 158 graduates.

Post-secondary education. It is at the post-secondary level where critical inadequacy is apparent in the Malaysian educational system. With only 5 percent of the age group 17+ to 18+ enrolled in any kind of publicly-assisted education at this level, economic development will be slow indeed.* And again, from the point of view of manpower development for economic growth, it is noted that, out of the 17,454 students enrolled at this level

---

*Some improvement has been made since 1967, including developments at Ipoh. During the writer's visit to Malaysia in October and November of 1969, there were some evidences of increased interest in post-secondary education. However, there was "talk" at that time of converting the Technical College, Kuala Lumpur, into a degree-granting engineering college. If this is done, engineering-technical education (semi-professional level) will be almost non-existent in Malaysia.

Table 14

Population and Enrollments In Post-Comprehensive Assisted Schools
By Level And By Type of School

Malaysia, 1967

Level and Type of School	Age Group	Population in the Age Group	Total Number Enrolled
Upper-secondary education	15+ to 16+	401,966	65,812
1. Assisted schools (post-comprehensive)			64,022
2. Technical institutes			1,196
3. Trade schools			594
Post-secondary education	17+ to 18+	365,256	17,454
1. Form VI			5,937
2. Teacher training			9,690
3. Technical College (Diploma)			703
4. MARA Institute			551
5. College of Agriculture			437
6. Technical Institutes			136
University level education	19+ to 21+	471,652	4,609
1. University of Malaya			4,560
2. Technical College (Professional)			49

Source: Ref. 22, Table 2, p. 7.

in 1967, over 15,500 were in Form VI (preparation for university) and/or teacher training; and only about 1,800 were enrolled in programs of occupationally-related studies which could provide qualified manpower for the shortages in manufacturing, technology, and agriculture identified in Section V above.

Strategies for educational development. As a developing nation progresses toward agreed-upon but difficult-to-attain goals, the national government is, of course, subject to many political pressures, and it must be sensitive to the many needs of the people. Some of these "pressures" and "needs" are listed here for discussion.

1. The egalitarian goal of primary education for all, which emanates from all levels of society and conditions of men.
2. The pressure from elitest groups for rapid expansion of university education, and often for expansion into graduate work in fields which, at the time being, may have little relationship to economic development or national needs.
3. The pressure for expansion of the secondary school system so that larger numbers of youth can be prepared for the university, and for "white collar" occupations, even though white collar jobs are not available.
4. Pressures from economic planners and labor ministry people to provide a variety of job-training programs on an ad hoc, "crash" basis, to "meet the needs of the economy," and to satisfy political blocs.

Let us discuss each of these briefly, in the order listed above. The need for universal primary education is difficult to argue against, and if a developing nation can possibly spare the resources, this "need" should be

met promptly and effectively. However, if the diversion of an inordinately large proportion of the nation's resources to the universal primary education goal precludes investment in educational programs at other levels which may have much greater rate of return to economic development, then leaders in government may have to take the politically unpopular position of slowing down growth at the primary education level in order to speed it up at other levels.

The development of a great university is a goal to which all developing nations aspire, and it is an objective which is most unpopular to denigrate. Assuredly, developing nations need the kinds of high-talent manpower which only universities can produce; but, in view of the astronomical costs of university-level education, government leaders, in establishing priorities for educational investment, cannot issue "blank checks" to university authorities, with no limits placed on the amounts to be spent. Some university-level programs are important to development; others are not. Some programs might be of great value a decade hence, but have little value now. It behooves those responsible for the investment of scarce national resources to make sure that investments in university programs will really make a contribution to economic, political, and social development; and that large sums will not be spent on programs, schools, or courses from which the rate of return to the nation is known to be low or non-existent at present. Students interested in higher education primarily as a consumer good may have to attend a foreign university at their own expense until such time as the nation can afford higher education as consumption rather than as investment.

Expanding secondary school enrollment is a popular social goal, and in many developing nations inadequacies at this level of education constitute

the most critical factor impeding national development. In Malaysia's case, however, the participation rate (52 percent of the age group) in lower secondary education is judged to be adequate at the present stage of development. Indeed, a case could be made (on economic development grounds) for reducing expenditures at this level in order to increase them at other more productive (from a manpower development point of view) levels. It is estimated that nearly 44,000 students in 1969-70 will leave school at the completion of Form III and not go on into upper secondary school (Ref. 24, Tables I and II). This represents a drop-out rate of about 40 percent at the boundary between lower-secondary and upper-secondary levels. The same source indicates that, upon completion of upper secondary school (Form V) nearly 90 percent of young people end their formal schooling. Out of 37,948 students estimated to be enrolled in 1969-70 in Form V, only 5,331 are expected to enroll in 1970-71 in Form VI for university preparation; and, based on 1967 data (information for 1968-69 is not available to the writer), only about 2,000 will enter post-secondary technical or business training. Perhaps 10-12,000 will enter teacher training of one kind or another.

It is a known fact that one of the critical problems in Malaysia's manpower mix is an oversupply (with respect to the number of jobs available) of persons with an academically oriented secondary education. The following quotation is from page 13 of Ref. 16:

> "The greatest degree of imbalance between manpower requirements and supply in the 1965-1970 period appears with respect to the upper-secondary arts and science stream, accounting for 21.8 percent of all school leavers in 1970. Less than 5 percent of the new jobs call for this type of qualification."

In a similar vein, Table 4 of the same source lists the "Total Manpower Requirements 1965-1970" for Skilled White-Collar Workers as 21,608

new jobs; and the output of the arts and science streams of the upper secondary school for the same period as 145,000 young graduates! Assuming that there are places in post-secondary education of all kinds for about 12,000 students per year, there remains an "oversupply" of academically oriented secondary school graduates of about 65,000 young people for the five-year period. The inferences from Tables 2 and 3 in this regard, should be recalled also. (Table 2 showed that unemployment in the 1960's was very high among persons with secondary school education and training; but that it was very low, almost zero, among persons with higher education and/or technical training.)

With these facts in mind it would therefore seem (economically) unwise to continue expanding secondary education merely for the sake of expansion. Perhaps there could be greater emphasis on occupationally-related programs within secondary education; or, better, still, funds which would be required for further secondary education expansion should be re-allocated to post-secondary education.

Job training programs. Manpower commissions, labor ministry experts, and vocational educators are prone to extol the virtues of "job-training" programs. In general, the premise adopted is that occupational training or vocational/technical education is something apart from the main stream of education, and that separate schools and institutes should be set up for manpower development at various levels--vocational and trade schools at secondary level; and technical institutes, business colleges, nursing schools, etc. at collegiate levels. Another premise is that youngsters (with their parents' concurrence) can (and should) decide on a vocation at an early age, so that the student can enroll in the "proper" kind of vocational school to prepare him for his chosen trade or career. A third premise is that the

manpower needs of the nation can be identified as they arise, and "crash programs" of job-training can be invoked on an ad-hoc basis to deal with each need as it arises.

Educational planners in Malaysia might well profit from a review of some findings in other nations, including the United States, where the following general principles, which cast doubt on some of the above premises, have been found to be operating in recent decades:

1. Youngsters (and most parents concur) are extremely reluctant to leave what they regard as the "main stream" of education to enter vocational education at an early age.
2. Occupations at middle manpower and semi-professional levels increasingly demand greater content in science, mathematics, and general education, which preparatory subjects are found in the academic stream, or in "comprehensive" high schools, not in vocational schools.
3. As a nation's economy becomes more capital-intensive (greater amounts of costly equipment to be used by the worker) employers demand additional maturity from employees, and young workers below the age of 18 find fewer and fewer jobs open to them just because they are too young.
4. Since the age of entry employment is rising in industrial economies, there is less justification for providing vocational education at an early age. Students might well be retained in comprehensive education programs for a longer time, with vocational education beginning not earlier than the 11th grade. Thus, job training occurs in the years immediately before gainful employment rather than in childhood and early adolescence. (Malaysia has already

moved in this direction by making secondary education comprehensive through the lower-secondary school.)

5. Secondary school pupils generally are not ready to make irrevocable decisions about their lifelong careers. Consequently, secondary education programs are probably best when "streaming" or "tracking" is not too rigid, and a degree of open-endedness is retained. When a student knows that he (or she) can elect drafting, machine shop, electronics, or stenography, and still be "in the main stream" of education, he is far more amenable to sampling some vocational courses. But when faced with the decision at age 15 as to whether to go the vocational school route (with very little chance of return to the main stream) or the academic route, both the student and his parents will (typically) resist the vocational stream decision.

   As the popular phrase goes, "Vocational education is a great thing--for somebody else's child."

6. Vocational education for middle manpower level jobs is best accomplished at post-secondary institutions anyway. And, even in specialized occupational programs, input from academic disciplines and from general education is necessary. Mathematics, science, economics, and language study are "vocational subjects" too, and will become even more important as technology brings dramatic changes to Malaysian society.

7. "Crash" job-training programs are extremely expensive, costing from two to five times as much per person per month of instruction as do occupationally-related programs offered in "the main stream" of education.

8. The very philosophy of ad hoc training programs has been criticized on the grounds that it is a program of "reacting to crises." By the time "needs for workers" are identified and "crash" training programs are established, the economic situation has often changed and workers with the specialized training provided are no longer needed. Flexible, "main-stream," occupational education programs, whose curriculums are occupational field-oriented instead of specialized job-oriented, have proved to be a better investment in the long run than "job-training" programs on an ad-hoc basis.

It may be that not all of the eight principles just listed, though they are generally applicable to free-enterprise, technologically-based economies, necessarily apply to Malaysia. But their applicability ought to be tested before massive sums of money and years of planning go into a continuation and expansion of a system where vocational education and academic education are regarded as separate and apart from one another. In a sense all education is vocational education, in that it prepares young people for their vocations in life. Developing countries, with scarce resources for education at best, can hardly afford the luxury of education at any level which is completely non-utilitarian. Once it is realized that both cognitive processes and manipulative processes are involved in nearly all vocations, the old dichotomy between academic education and vocational education can be dissolved. All youth will then profit from experiencing both cognitive activities and manual activities in school, and the decision as to the final choice (a vocation which is primarily cognitive or one which is primarily manipulative) can be deferred until the completion of secondary school. And, even when a decision is made at, say, age 16 or 17, there should be doors that are left open in order that lateral mobility might be possible between

the upper-secondary and post-secondary "academic" and "vocational/technical" streams.

The Educational System--A Summary. To close this section, several suggestions are offered for the consideration of Malaysian educational planners. Admittedly, these suggestions have a manpower development/economic growth bias.* Other considerations--political stability, cross-cultural communication, national unity, etc.--will undoubtedly affect final decisions, and rightly so. The suggestions follow:

1. Quantitatively, primary education has reached a very satisfactory level of over 90 percent participation. Emphasis in the next decade should be on improving quality through better teacher education and improved instructional materials.
2. Steady, but carefully controlled, growth of university-level education is indicated. It would probably be better to use available funds for expansion and improvement on the present campus than to start new universities in other locations, at least until the enrollment on the present campus reaches 15,000 students. Some measure of control should be exerted over the programs offered and the numbers of students enrolled. Developing nations cannot afford the luxury of uncontrolled funding of costly "non-utilitarian" programs at the university level. It is always unpopular to criticize the liberal arts and the humanities and, in all truth, a university is not a university unless it is a place where the

*Also admittedly, they are based on a "target-setting" approach to manpower planning, since no "rate of return" analyses on post-secondary, collegiate-technical education are available for Malaysia.

arts and the humanities have an important role; but the central thrust of public higher education in underdeveloped nations has to be applied to reaching development goals rather than to the satisfaction of "consumer need." Engineering, agriculture, business administration, medicine and health, teacher education, architecture, natural resources, economics--these and similar programs producing high-talent manpower should be the major concern of university education for some years to come.

3. In quantitative terms, secondary education need not be a major concern for the next several years. Already, there are far more graduates of the secondary arts and sciences stream than can be effectively absorbed by the nation's economy. Continued improvement in quality (better teachers and improved instructional materials) should be sought however. And, in the light of a previous comment, increased emphasis should be placed on comprehensiveness (including a balanced cognitive-manipulative content) in secondary school programs. Guidance and counseling services should be available to all students to assist them in choosing careers and in selecting educational programs and curriculums which lead to those careers. In the opinion of this writer, the allocation of scarce resources merely to increase the quantity of secondary education, could not be justified at this time.

4. Although crash programs of job-training may be deemed necessary from time to time, it should be realized that each such program is a crisis response to a failure in the "regular" educational system. With careful planning, wise expenditures, and good coordination between schools and other agencies (including the private sector of

the economy), the educational system itself can become the source of almost all the nation's trained manpower, thus making crash programs virtually unnecessary.

5. The most serious weakness in the present educational system is at the post-secondary, collegiate-technical level. With only a handful of institutions serving this need, and these graduating only a few hundred qualified semi-professionals annually, the situation is one of almost crisis proportions. For example, only 155 graduates of the College of Agriculture were reported for 1968-69; and only 140 graduates (at the farm adviser level) were expected from the Schools of Agriculture in 1969. MARA Institute reports increasing enrollments, but the number of graduates at middle manpower levels remains disappointingly small. Kuala Lumpur Technical College enrolled 944 students in 1968 (Ref. 20, p. 102) but the number of graduates still does not exceed 200 annually. The Polytechnic at Ipoh has no graduates as yet, and will turn out only about 100 per year beginning in 1971-72. The proposed new vocational schools which, it is planned, will be established with assistance from the World Bank, are for the most part intended to train tradesmen and craftsmen rather than semi-professional technicians. In almost all fields of middle manpower Malaysia needs an immediate and major expansion of quality programs of post-secondary, collegiate-technical education--in agriculture, in engineering/science technology, in business, in health and medical fields, and in public service fields. Whereas the annual supply of qualified graduates at the sub-professional/technician level is now less than one thousand persons (not counting teachers), the growth of

the economy indicates a need by 1975 of over five thousand annually.

The suggestions offered above for action at various levels of the educational system agree in some ways with those offered in a recent position paper prepared by the Economic Planning Unit, Prime Minister's Department. However this paper (Ref. 25, The Economic Demand for Education in Malaysia) does not even recognize the post-secondary (collegiate-technical) level as being a bona-fide level of education. It tacitly assumes that a three-level education system--primary, secondary, and university--can properly provide for manpower needs in a developing economy. The position taken by the present writer, in contrast, is that the collegiate-technical level is exactly where the major effort should be made in the 1970's.

This challenge--education for middle manpower development--should be the first order of business for planners in Malaysia during the Second Plan period.

VII. SUMMARY AND A PROPOSAL

Throughout this exercise, which should be read as a "think-piece" rather than as a careful research report, the writer has been aware of the imprecise nature of manpower information, and of the lack of information on recent developments (1968-1970) in the economy and in the educational system. Much social research is based on information which is several years out of date, and this paper is no exception. The dynamics of societies change those societies in unexpected ways even as social scientists are predicting expected changes. No nation stands still for the convenience of data gatherers; and no free people ever fits exactly into the schemes of manpower planners. So it is with Malaysia, and so it should be.

Notwithstanding all the uncertainties however--and they have been frequently acknowledged in the foregoing pages--there is ample justification for concern about the relationship between education and manpower development in Malaysia. The following propositions are offered, in the hope that they will engender debate, inquiry, research, and hopefully, action.

1. Economic growth of the magnitude desired in Malaysia will not occur unless present shortages of high-talent manpower (professional and sub-professional/technical) are quickly alleviated.
2. The shortage of professional manpower, though serious, can be met by a relatively modest expansion of university-level programs and enrollments. It is the recommendation of this writer that, for the decade of the 1970's, all university-level expansion could and should take place on the present campus. A proliferation of university campuses would seriously strain the nation's educational budget and

simultaneously militate against the drive for excellence at the University of Malaya.

3. The extreme shortage of middle manpower (sub-professionals, semi-professionals, technicians, and very highly-skilled craftsmen) is perhaps the single biggest obstacle to economic development.
4. Necessary goals for middle manpower development will not be met by a continuation of present educational policies. "More of the same" may prevent further retrogression, but it will not bring progress.
5. What is needed is "a new view of semi-professional education," a recognition that a fourth level of education is needed in between secondary education and university education. This "new view" would recognize that education for the semi-professions belongs in the main stream of education, rather than being relegated to a number of specialized, single-purpose schools with precarious funding, sub-standard equipment, and uncertain charters--all outside the main stream and often regarded by students as "second choice" schools. In this connection, the Higher Education Planning Committee recommended, in 1967, that 16 percent of 17-year olds should have an opportunity for college-level education, including teacher training (Ref. 26, p. 209).
6. A "quantum jump" is needed at this point in time--a catalyst for change--an educational idea with popular appeal, incorporating flexibility with responsiveness to national and community needs.
7. The embodiment of such an idea is the two-year college, or "junior college" as it is called in several countries (the United States, Chile, Japan, Canada, Ceylon, India). It is suggested

that the establishment of a national system (perhaps with some State support) of publicly-supported two-year colleges could be the most fruitful action of the decade for economic development in Malaysia.

What Is A Junior College?

There follows a partial list of the characteristics and attributes of two-year junior (community) colleges:*

1. They are post-secondary, comprehensive, collegiate institutions.
2. They provide both academic education (that is, VI Form in Malaysia) and collegiate-technical education.
3. They are low-cost colleges, located near centers of population, making access to higher education available to increased numbers of qualified secondary school graduates.
4. They ordinarily offer programs and courses which are applicable to the first year (and in some cases, the second year) at a university so that students may later "transfer" to a university; and they offer occupational programs at sub-professional, para-professional and highly-skilled levels related to several broad fields of the economy, including agriculture, business, health, industry/engineering/science, and public services, including teaching (See Ref. 28).
5. Their programs lead to graduation with an appropriate degree, diploma, or certificate.
6. They provide guidance, career counseling, and job placement service to students and former students.

---

*See Ref. 27 for more information.

7. They may offer "remedial" programs and courses (similar to "remove" classes in Malaysia) to students who need review work before pursuing a "regular" program.
8. They are involved in community needs--meeting the demand for education and manpower development of the local community, as well as the needs of the nation as a whole.
9. They are ordinarily commuting institutions, although some colleges do provide residence facilities for some of their students whose homes are too far away to commute.
10. They are directly concerned with "average" students and with the development of middle manpower--precisely the concerns which are most relevant to developing nations.

Alternatives To A System of Junior Colleges

Naturally, there is a reluctance to create a new kind of educational institution if national goals can be met merely by providing more of what already exists. An argument might be advanced that the serious middle manpower shortages discussed in this paper could be met in Malaysia by:

1. Building three or four more technical colleges for producing technicians in industry/engineering/science fields.
2. Providing ten to a dozen new vocational/technical schools at secondary levels to produce skilled craftsmen and tradesmen.
3. Establishing several new business colleges to train the junior managers, accountants, secretaries, salesmen and data programmers needed by the business world.
4. Setting up a few new schools to train nurses, medical lab technicians and other paramedical personnel.

5. Building and staffing additional (single purpose) teachers' colleges.
6. Establishing one or two new university colleges in response to the increasing demand for places in higher education.
7. Establishing several new institutes for training persons for the public services--policemen, firemen, foresters, fisheries technicians, government operatives, etc.
8. Doubling the facilities for training sub-professional agricultural advisers and technicians.

All of these steps could be taken, and if they were, beneficial effects on manpower development would certainly result. Tentative plans already exist to accomplish some of these steps (Ref. 27). However, there are a number of compelling reasons why the development of a system of comprehensive junior colleges would represent a much better long-range solution to economic and social development, than would the expansion of the present system in the ways listed above. Some of the advantages of the latter course are listed:

Advantages of a System of Comprehensive Junior Colleges

1. Many (perhaps a majority of) youth do not reach a career decision by the age of seventeen. They want and need career guidance, and a chance to "sample" college subjects before deciding on (1) trying to prepare for the university, or (2) a semi-professional career in business, teaching, technology, agriculture, the health occupations, or public service. Attendance at a comprehensive junior college allows the student to make his career decision after he has acquired some factual basis on which to make it. Enrolling at a single-purpose, "specialized" institution, on the other

hand, forces him to make this decision in advance, before he really knows what his talents and interests are.

2. The comprehensive junior college provides for all students a core of general studies in science, mathematics, languages, and the arts. Since these academic subjects are needed for almost all semi-professional level occupations, the junior college is a more suitable institution for semi-professional/technical education than is a vocational school, even if the latter is post-secondary.

3. For the students who have a university goal in mind, the junior college gives them ample opportunity to test their abilities and interests. If either ability or interest is lacking the student can easily move laterally into one of the college-level occupational programs without loss of face or the expense of moving to a specialized school in some other city.

4. Many economies of scale can be realized, since mathematics, science, language, and social science classes can be taught by large-group instruction methods. Specialized colleges, on the other hand, tend to have small enrollments (500 and under) with concomitant small class size and high unit costs.

5. Capital outlay costs per student tend to be less than they would be in building a number of specialized colleges for the same total number of students. Library utilization, student-station utilization, and space utilization are all better in a comprehensive situation than in specialized institutions.

6. With respect to social development, the values of interdisciplinary contacts should be recognized. In the comprehensive junior college, future professionals meet and make friends with future electronics technicians; the accounting/management student meets and knows young people training for

the health occupations; the mathematics major and the law enforcement trainee may become good friends; and the future teacher may share a hobby interest with a future secretary. All share in common student body interests and in a common core of general studies.

7. Flexibility is an attribute of the comprehensive junior college. When manpower needs change, it is much easier to phase out a program and start a new one, than it is to de-activate an entire college and start a new one.

8. A junior college may have as many as thirty or forty different educational programs, each with from twenty to 100 students, and a total student body of from 400 to 4,000 students. Adding a new program to a comprehensive junior college is relatively easy and relatively inexpensive; whereas starting a new, specialized college to train 50 fisheries technicians (for example) would be exhorbitant in cost.

9. Higher education, through the two-year college, becomes an economic good for the whole society rather than a scarce commodity to be rationed out to the fortunate few.

10. The junior college is a long range solution to manpower development. Once it is well established, the era of ad hoc reactions to crisis manpower shortages at semi-professional/technical levels is past. Middle manpower needs are thus met within the main stream of the educational system rather than by appendages hastily tacked on to meet exigencies of the moment.

SPECIFIC RECOMMENDATIONS

It is suggested that the Prime Minister's Department, Economic Planning Unit (EPU); and the Ministry of Education, Educational Planning and Research

Division (EPRD), jointly formulate a Junior College Feasibility Study Committee, made up of government officials from the cognizant ministries, lay citizens from the private sector, and one or more representatives from the University of Malaya, to consider the following recommendations:

1. That a national system of junior colleges be established in Malaysia.
2. That the system be planned during the Second Plan period, 1970-75, and put into full operation by 1975.
3. That approximately 15-20 such colleges, with a total enrollment of some 40,000 students be in operation by 1976, pursuant to the explanation in the next recommendation.
4. That all existing post-secondary and collegiate-level (not university-level) institutions, including technical institutes, teachers' colleges, agricultural colleges, business colleges, nursing schools, MARA Institute, etc., be phased into the junior college system and included within the above total of 15-20 colleges.
5. That, although these colleges would all offer a comprehensive program of studies, including first and second-year university-parallel courses, provision be made within the system for differentiation of function. One or more colleges might be especially strong in business management; others could emphasize engineering and industrial technology; and others agriculture, and so on.
6. That tuition and fees be kept as low as possible, and that scholarships, grants, and work-study plans be available for qualified students of low income status.
7. That, although a policy of "open admissions" to the colleges be maintained, each curriculum will have entry and performance

standards consistent with the career or job for which it is designed. Programs such as nursing, engineering technology, police science, etc., which require actual job experience, would feature a cooperative arrangement for the "internship," between the college offering the educational program and the hospital, manufacturing plant, or government agency where the work experience is available.

8. That career guidance, counseling services, and job placement services be available for all students at each college.
9. That, in addition to being a unit in a national system of junior colleges, each college serve as a "community college," effecting liaison with both the public and private sectors of the economy in its region.
10. That annual studies be made of the middle manpower supply and demand situation, in order that the proposed junior college system can plan effectively to meet national and local manpower needs.
11. That the University of Malaya, through its Faculty of Education, in cooperation with its several other faculties, initiate a program of junior college teacher preparation at a master's degree level, and that the university sponsor institutes, seminars, conferences and evening classes for prospective junior college teachers and administrative officers.
12. That the University of Malaya, through its several faculties, assist in the planning of the university-preparatory and the university-parallel programs and courses offered by the junior colleges.
13. That complete records be kept from the inception of the system, including the following as a minimum:

13.1 Enrollment, completion, and attrition records, by colleges and by curriculum.

13.2 Annual per-student operating costs, by college and by curriculum.

13.3 Follow-up studies on students and graduates--placement in jobs, earnings, promotion histories, etc.

13.4 The specific contributions to manpower development and economic development of the several colleges and curriculum, both nationally and locally.

13.5 Capital outlay costs for buildings and equipment, amortized over time periods consistent with Malaysia's government policies.

14. That, with data from these and similar records, cost-benefit (rate-of-return) analyses be made on the system, and on selected curriculums of the system, beginning in the late 1970's.

15. That, if the Junior College Feasibility Study Committee concurs with the general substance of these recommendations, it make or cause to be made, during 1970-71, a "master plan" study for the establishment, financing, and operation of the proposed system of junior colleges.

REFERENCES

1. Harbison, Frederick, and Charles A. Myers, Education, Manpower, and Economic Growth; McGraw-Hill Book Co., New York, 1964. Also, see Manpower and Education (1965) by the same authors.

2. Hagen, Everett E., The Economics of Development; Richard D. Irwin, Inc., Homewood, Illinois, 1968.

3. Schultz, T. W., The Economic Value of Education; Columbia University Press, New York, 1963.

4. Denison, Edgar F., The Sources of Economic Growth and the Alternatives Before Us; Committee for Economic Development, New York, 1962.

5. Correa, H., The Economics of Human Resources, North-Holland Publishing Co., Amsterdam, 1963.

6. Vaizey, John, Education in the Modern World; World University Library, McGraw-Hill Book Co., New York, 1967.

7. Becker, Gary S., Human Capital, Columbia University Press, New York, 1964.

8. Weisbrod, B. A., External Benefits of Public Education: An Economic Analysis, Princeton University Press, Princeton, New Jersey, 1964.

9. The Journal of Human Resources: Education, Manpower, and Welfare Policies, published quarterly by the University of Wisconsin Press, Madison, Wisconsin.

10. Innes, Jon T., Jacobson, and Pellegrin, The Economic Returns to Education--A Survey of the Findings; Center for the Advanced Study of Educational Administration, University of Oregon, Eugene, 1965.

11. Hunter, Guy, Higher Education and Development in South-East Asia, Vol. III, Part I, High-Level Manpower, Unesco and the International Association of Universities, Paris, France, 1967.

12. Crosson, Pierre R. Economic Growth in Malaysia, Center for Development Planning, National Planning Association, 1606 New Hampshire Ave., N.W., Washington, D.C., 1966.

13. Government of Malaysia, Office of the Prime Minister. First Malaysia Plan, 1966-1970, Kuala Lumpur, 1965.

14. _____, Ministry of Labour. An Outline of the Manpower Situation in West Malaysia, by Ozay Mehmet, ILO Manpower Expert; 20 pp. plus tables, mimeo; Kuala Lumpur, July 1969.

15. Straits Times Annual, 1970, The Straits Times Press (Malaya) Berhad, Kuala Lumpur, 1969.

16. Government of Malaysia, Prime Minister's Department, E.P.U. Manpower Requirements in Malaya, 1965-1980, 22 pages plus tables, mimeo; Kuala Lumpur, 1966.

17. _____. Skill Manpower Requirements for Agricultural Development in West Malaysia, 1966-1985, 8 pp. mimeo; Kuala Lumpur, 1966.

18. _____. Manpower Requirements of Manufacturing Industries, States of Malaya, 1965, 22 pages, mimeo; Kuala Lumpur, 1966.

19. Technical Association of Malaysia and Singapore. Proceedings and Papers Presented at the Seminar on Supply and Deployment of Scientific and Technological Manpower, The Association, Kuala Lumpur, 1969.

20. Government of Malaysia, Office of the Deputy Prime Minister. Mid-Term Review of the First Malaysia Plan, 1966-1970, Kuala Lumpur, 1969, 135 pages.

21. Dr. Abu Bakar bin Ibrahim, J.S.M., M.B.B.S. Certain Aspects of Health Manpower Planning in West Malaysia, Ministry of Health, Government of Malaysia, Kuala Lumpur, 5 pages plus tables, mimeo.

22. Ministry of Education, Government of Malaysia. Educational Statistics of Malaysia, 1938 to 1967, Kuala Lumpur, 1968, 157 pages, illustrated.

23. _____. Education in Malaysia, The Educational Planning and Research Division, Kuala Lumpur, 1968, 96 pages, illustrated.

24. Ministry of Labor, Government of Malaysia. A Projection of Enrolments and School Leavers in the Primary and Secondary School System of West Malaysia, 1967-1973. Kuala Lumpur, 1969, 4 pp. plus charts, mimeo.

25. Government of Malaysia, Prime Minister's Department, E.P.U. The Economic Demand for Education in Malaysia, A Comparison of the "Manpower Requirements" and "Rate of Return" Approaches, by Donald Hoerr; Kuala Lumpur, 1969, 33 pages, mimeo.

26. Government of Malaysia, Ministry of Education. Report of the Higher Education Planning Committee, Kuala Lumpur, 1967, 306 pp.

27. Hall, Budd L. The Junior College in International Perspective, Topical Paper No. 8. ERIC Clearinghouse for Junior College Information. The University of California at Los Angeles, Los Angeles, Calif., U.S.A., Jan. 1970.

28. Harris, Norman C. Technical Education in the Junior College, American Association of Junior Colleges, 1 Dupont Circle, Washington, D.C., U.S.A., 1964.